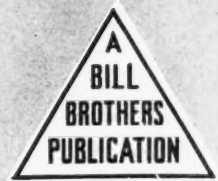


# INDIA RUBBER WORLD

OUR  
62nd YEAR



MAY, 1951

*Sterling-NS* *HOT* *Sterling-SO* *Sterling-L*  
*NATURAL* *Spheron-9* *"X"* *Spheron-4*  
*Sterling-S* *GR-S* *Vulcan-3*  
*SYNTHETIC* **CABOT**  
*Spheron-6* *COLD*

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DETROIT

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**There's a DU PONT AQUAREX  
for any requirement . . .  
Mold lubricant—wetting agent—latex stabilizer**

**AQUAREX ME**—A dry powder with minimum electrolyte content. Dilute solutions of Aquarex ME provide highly efficient mold release with little lubricant build-up. It is an excellent stabilizer and wetting agent for latex compounds. Aquarex ME increases the penetrating power of impregnating compositions and increases fluidity of dispersions, slurries or pastes of insoluble dry powders.

**AQUAREX MDL PASTE**—Where an aqueous paste is preferred, Aquarex MDL can be used to replace Aquarex ME. Although Aquarex MDL has a slightly higher electrolyte content than Aquarex ME, their properties are very similar.

**AQUAREX D**—Where a higher electrolyte content can be tolerated, Aquarex D can be used to advantage in latex compounding. The active ingredient for Aquarex D is the same as Aquarex ME, and it is an excellent mold release agent. However, lubricant build-up is slightly more rapid because of the higher electrolyte content.

**AQUAREX L PASTE**—Specifically developed as a corrosion-inhibiting mold lubricant. Tests show Aquarex L Paste does not contribute to corrosion of steel. In fact, tests indicate it even protects steel from corrosion by dilute mineral acids. Because it is so effective for mold release, solutions of low concentrations are practical.

**AQUAREX NS**—An amphoteric stabilizer for use in most types of neoprene latex compounds. Can be used in low pH compounds for dipping, gelation molding or adhesives, since it is effective even in acid systems. Useful in spreading or combining compositions because it is an excellent stabilizer with lower wetting power than Aquarex D.

Complete information on Du Pont Aquarexes will be found in Bulletin 51-2. Extra copies are available. Write: E. I. du Pont de Nemours & Co., or the nearest district office.

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## News about

## B. F. Goodrich Chemical Company raw materials



for improved, lower-cost  
rubber compounding—use

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## RESIN 50

**W**ITH this easy-processing reinforcing agent, you can make important savings on your rubber-compounding costs. Finished products will be improved, too.

Just see what Good-rite Resin 50 does! It provides a new compounding approach to hardness problems. For example, it's a simple means of filling in the gap between soft rubber compounds and ebonites.

It saves time by eliminating master-batching. It gives rubber compounds better flex life, higher elongation, improved abrasion resistance. Compounds are more easily handled because Resin 50 acts as a plasticizer at processing temperatures.

For extruded shapes such as gaskets, tubing, coving, etc., particularly on hard compounds, Resin 50 provides improved surface smoothness and superior processing characteristics in the extruder.

Made as a white, free-flowing powder, Good-rite Resin 50 can be compounded in a wide range of colors. It may help you improve your rubber compounding, save you money, too. Under present conditions, demand for Good-rite Resin 50 exceeds supply. However, limited quantities are available for development work. For technical bulletins and advice, write Dept. CB-3, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco.

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In tires processed with **Philblack\* O!***

"Foiled again!" says Old Man Tire Trouble. "There's just no slashing miles off treads made with Philblack O."

Time after time Philblack O has demonstrated its great talent for dulling the attacks of cuts, bruises and chips on tire life. Combined with cold rubber, this HAF (High Abrasion

Furnace) black achieves phenomenal tire endurance. Minimum crack growth!

Bulk or bagged Philblack O is shipped from Borger, Texas. Lcl and ltl bagged shipments are also available from Borger and from Philblack warehouses in Akron, Boston, Chicago, Trenton, Los Angeles, Montreal and Toronto.

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PHILBLACK SALES DIVISION

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Philblack A and Philblack O are manufactured at Borger, Texas.  
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\* A Trademark

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### Rubber Chemicals

#### ACCELERATORS

- **Thiazoles**—MBT, MBTS, OXAF
- **Thiurams**—Monex, Tuex, Pentex
- **Dithiocarbamates**—Methazate, Ethazate, Arazate, Butazate, Safex
- **Aldehyde Amines**—Beutene, Trimene Base, Heptene Base
- **Xanthates**—ZBX, CPB
- **Activators**—DBA, GMF, Dibenzo GMF

#### ANTIOXIDANTS—BLE, Flexamine, VGB.

Aminox, Betanox Spec., Aranox

### Paracrils

#### BUTADIENE, ACRYLONITRILE COPOLYMERS, OIL-RESISTANT TYPES

- **Paracril AJ**—Medium Oil Resistance, best for low temperatures
- **Paracril B**—Good Oil Resistance, Excellent Aging
- **Paracril BJ**—Lower plasticity than Paracril B
- **Paracril BV**—Paracril B in Crumb Form
- **Paracril C**—Maximum Oil Resistance and Aging
- **Paracril CV**—Paracril C in Crumb Form



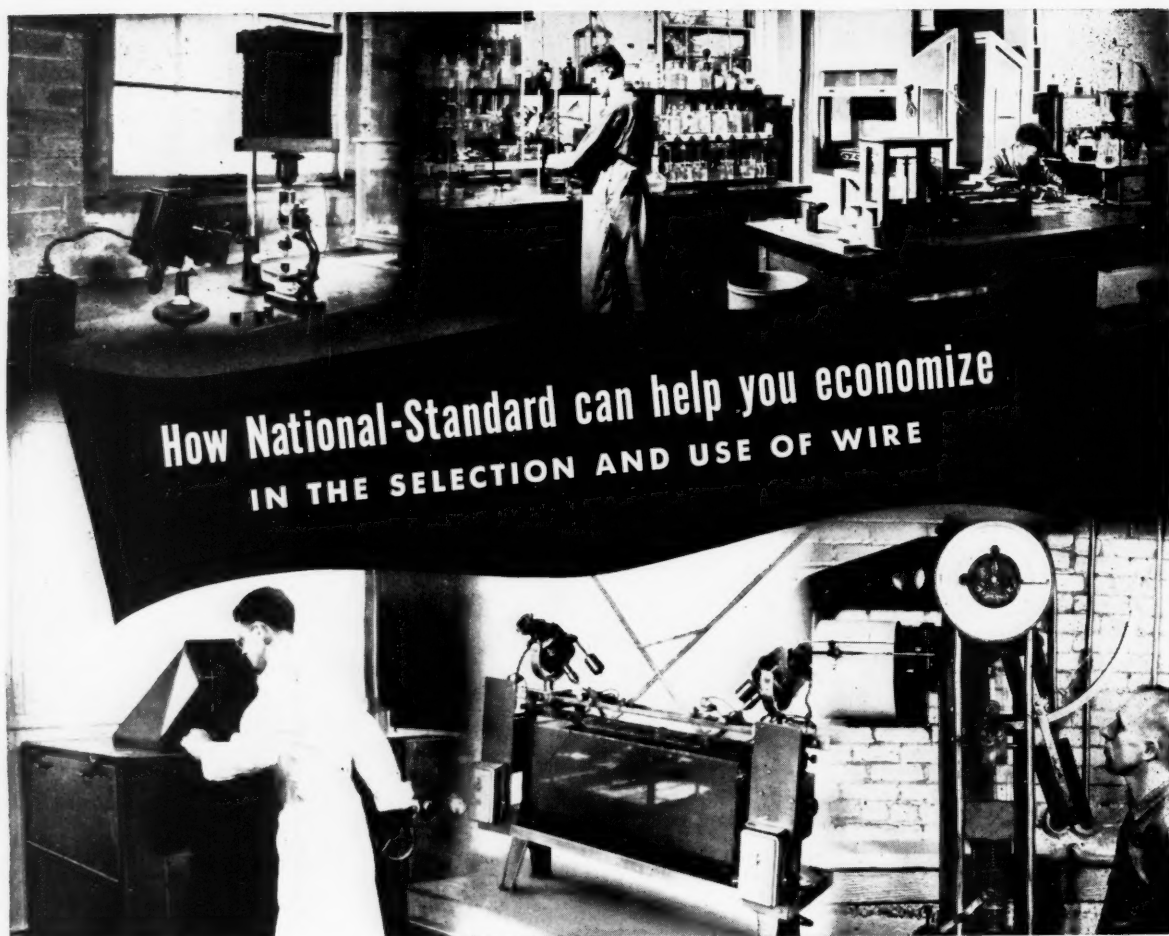
*Naugatuck Chemical* Division of United States Rubber Company  
NAUGATUCK, CONNECTICUT

IN CANADA: NAUGATUCK CHEMICALS DIVISION • Dominion Rubber Company Limited, Elmira, Ontario

Rubber Chemicals • Aromatics • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latexes

May, 1951

133



## A standing offer of service



**DIVISIONS OF NATIONAL-STANDARD CO.**

**T**HERE may be ways in which you can save a "penny" here and there in producing your tire beads, hose, belts or other wire-in-rubber products. National-Standard engineers, who have contributed cost-saving suggestions in many a rubber plant, always welcome the chance to help you find out.

For here at National-Standard we've spent a lifetime studying and improving the behavior of wire in rubber—digging into all the intricacies of application, fabrication, finish, corrosion, strength, adhesion and innumerable details you might never bother with.

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ATHENIA STEEL..Clifton, N. J.....	Flat, High Carbon, Cold Rolled Spring Steel
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WORCESTER WIRE WORKS..Worcester, Mass.....	Round and Shaped Steel Wire, Small Sizes

# rubber compounders prefer PLIOLITE S-6B

# 6 to 1

After direct comparison with competitive resins, rubber compounders throughout the industry report they prefer PLIOLITE S-6B—by nearly six to one! Specific characteristics of this use-proved Goodyear rubber reinforcing resin mentioned in the survey were:

**EASIER PROCESSABILITY**  
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**EXCELLENT PHYSICAL PROPERTIES**

PLIOLITE S-6B is already in use in shoe soles, wire insulation, flooring, rubber hose and tubing and a wide range of molded and inflated rubber items. But these are only a few of the potential uses of this leader in the field of copolymers for reinforcing rubber.

Write today for full details, and samples for your own evaluation, to:

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Pliolite—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio



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of most vinyl  
compounds...**

**with  
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<b>PRODUCT</b>	<b>USE</b>
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<b>TRI-BASE E</b> (Basic Lead Silicate Sulphate Complex)	Low volume cost insulation
<b>DS-207</b> (Dibasic Lead Stearate)	Sheeting, extrusion and molded compounds, i.e., insulated wire and vinyl phonograph records
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<b>PLUMB-O-SIL B</b> (Co-precipitate of Lead Orthosilicate and Silica Gel)	Translucent film and sheeting, belting
<b>PLUMB-O-SIL C</b> (Co-precipitate of Lead Orthosilicate and Silica Gel)	High grade insulated wire and sheeting
<b>DYTHAL</b> (Di-basic Lead Phthalate)	General purpose stabilizer for heat and light
<b>DYPHOS</b> (Di-basic Lead Phosphite)	Excellent for heat and light in all opaque stocks, including Plastisols and Organosols
<b>NORMASAL</b> (Normal Lead Salicylate)	Vinyl flooring and other compounds requiring good light-stability

**Dutch Boy<sup>\*</sup>**  
**CHEMICALS**



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Greatly increased service life for your opaque vinyl products—unequalled light- and heat-stability—excellent color retention—lasting flexibility... these are advantages of stabilizing with "Dutch Boy" DYPHOS.

"Dutch Boy" DYPHOS is effective in upgrading quality because it has all four properties of the ideal stabilizer:

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This is shown by accelerated tests in the laboratory and by actual outdoor exposure tests.

Most vinyl formulations with DYPHOS show a *useful life at least twice* that of similar compounds using other stabilizers.

DYPHOS is recommended for high-quality vinyl compounds, including plastisols; also for systems using chloroparaffins as secondary plasticizers.

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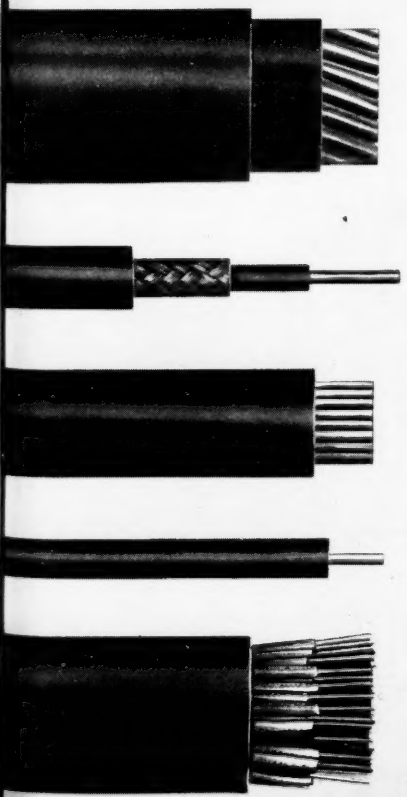


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Stocks compounded with PELLETEX will not only prove their worth in the beginning — they'll preserve their good qualities after long service. PELLETEX has splendid aging properties which make its compounds resistant to oil, grease, chemicals and the solvents likely to be around a garage, machine shop, factory or mine. The special SRF properties of PELLETEX make it easy to tube wire jackets smoothly and help them to hold their shape.

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Do your rubber products have  
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## Use Du Pont **"Alamask"** odorants

TRADE MARK

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Here are some specific—and successful—end uses for new "Alamask" odorants: For rug underlays (natural and synthetic, open or closed cell structure): "Alamask" LD, "Alamask" 6390, "Alamask" O. For blown natural-sponge pillow and mattress stock: "Alamask" O. For shoe adhesives, from natural latex: "Alamask" ND, from synthetic latex: "Alamask" 6337, "Alamask" 175. For rug backings: "Alamask" LD, "Alamask" ND. For natural smoke sheets: "Alamask" O.

## Du Pont **"Alamask"** odorants

TRADE MARK



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**Find out more!** Send for the booklet "Odorants for the Rubber Industry"—or ask us for specific recommendations for your individual problems. Write—E. I. du Pont de Nemours & Co. (Inc.), Organic Chemicals Department, Aromatics Section, Wilmington 98, Delaware. Branch Offices: Atlanta, Boston, Charlotte, Chicago, New York, Philadelphia, Providence, San Francisco.



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United channel blacks have been in use for decades and have an enviable record of satisfactory performance. They are uniform, dependable, and ever in demand.

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**CARBON BLACKS**  
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*bags are printed with your pigment number*



**UNITED CHANNEL BLACKS**  
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*handle exceptionally well*



**UNITED CHANNEL BLACKS**  
*are of uniform quality*



**UNITED CHANNEL BLACKS**  
*are always dependable*



**UNITED CHANNEL BLACKS**  
*are the standard for quality the world over*



**strengthen  
your synthetic  
with Purecal**

You can get close to natural rubber quality in GR-S when you reinforce it with Purecal\*, producing a non-black base. Here is the quality produced with a 150-part loading of Purecal U in a GR-S containing 20 parts of a medium hard cumarone indene resin:

Tensile strength—over 2000 pounds per square inch; elongation—over 700%; tear resistance (Crescent)—200 pounds; flex-life (pierced)—over 200,000.

These results are fairly common with Purecal U. In addition, Purecal U can be used to impart "building tack" to GR-S and Buna N compounds. It produces a base stock with carbon black quality which can be used *everywhere* that low gravity and high abrasion resistance are not a factor.

It will pay you to get acquainted with Purecal. Why not write for our free booklet?

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DICHLORIDE • AROMATIC SULFONIC ACID DERIVATIVES  
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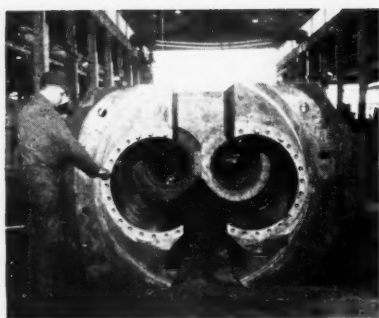
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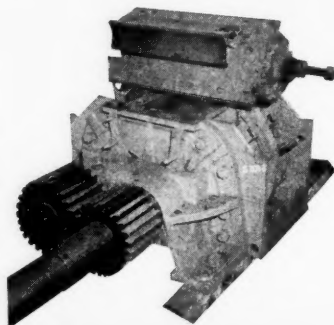
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**40% NITRILE RUBBER** — P-4, Methyl Acetyl Ricinoleate

**NEOPRENE GN** — P-6, Butyl Acetyl Ricinoleate

**GRS** — P-4, Methyl Acetyl Ricinoleate

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Please send samples of the Ricinoleate Esters checked  
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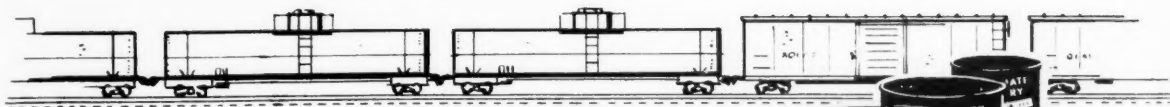
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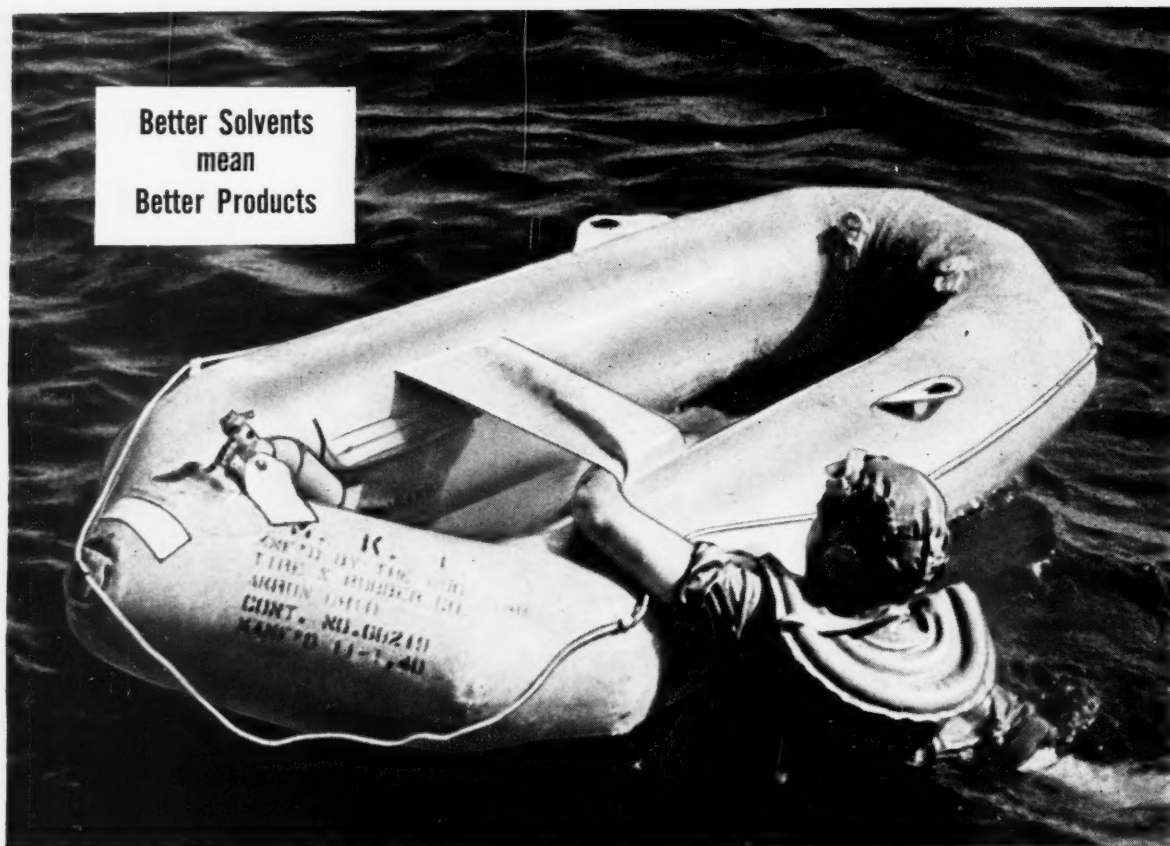
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### Skellysolve for Rubber and Related Industries

#### Applications

- SKELLYSOLVE B.** For making quick-setting cements for the shoe, tape, container, tire and other industries. Quick-drying, with no foreign taste or odor in dried compound.
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**"DOC" MacGEE SAYS:** The quality of your rubber product is the very life of your business—and the right solvents can do much to protect that quality! Making the right solvents for rubber and related industries has long been a business of Skellysolve. Here's why you can depend on it!

Skellysolve is always the same—batch after batch. Uniformity is assured by strict laboratory controls. You never have to worry about high vapor pressure and bloated containers . . . low or high boiling compounds that may cause blushing and blisters in tires and shoes or seeds in cements! And you're sure of high bonding strength because of Skellysolve's freedom from greasy residues.

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# Skellysolve

SOLVENTS DIVISION, SKELLY OIL COMPANY  
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**A LIQUID  
ACCELERATOR  
FOR LATEX—  
NATURAL and  
SYNTHETIC**

✓ **SIMPLIFIES LATEX COMPOUNDING**

✓ **ADD DIRECTLY TO LATEX**

✓ **NO GRINDING OR BALL MILLING NECESSARY**

## *Merac Offers these Advantages:*

1. It is a liquid accelerator which upon dilution with water is added directly to latex.
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3. It imparts high modulus and tensile strength with flat curing and good aging characteristics.
4. Its use provides compounded latex formulations which are stable on storage, exhibiting only moderate changes in viscosity.

## **PROPERTIES**

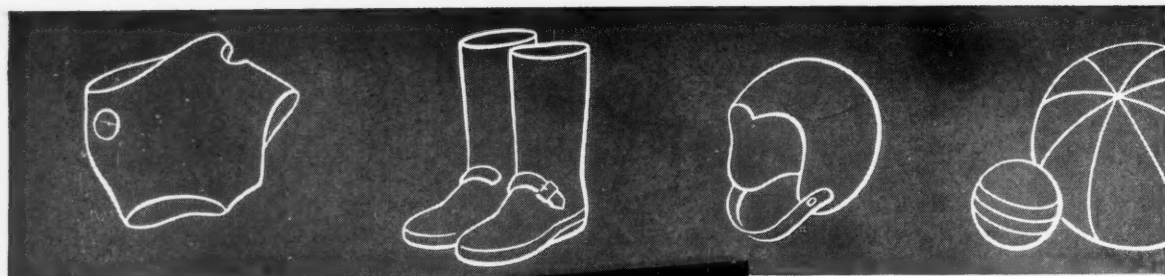
**Color—** Deep red to brown liquid  
**Odor—** Characteristic  
**Sp. Gr.—** 1.034 at 20°C.  
**Solubility—**  
Miscible with water  
Soluble in alcohol

*For technical information write to Dept. P.*



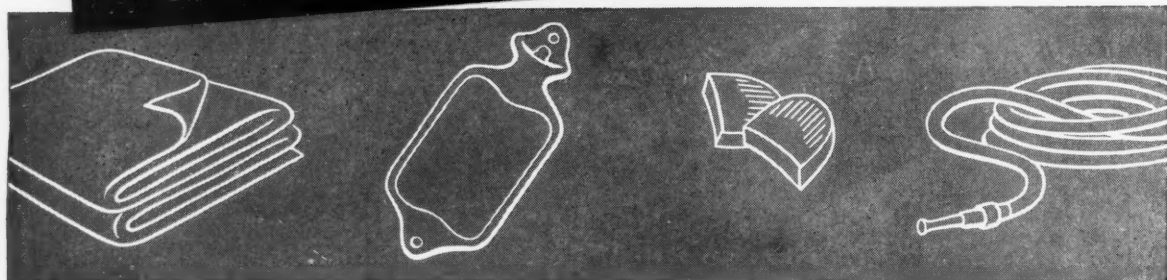
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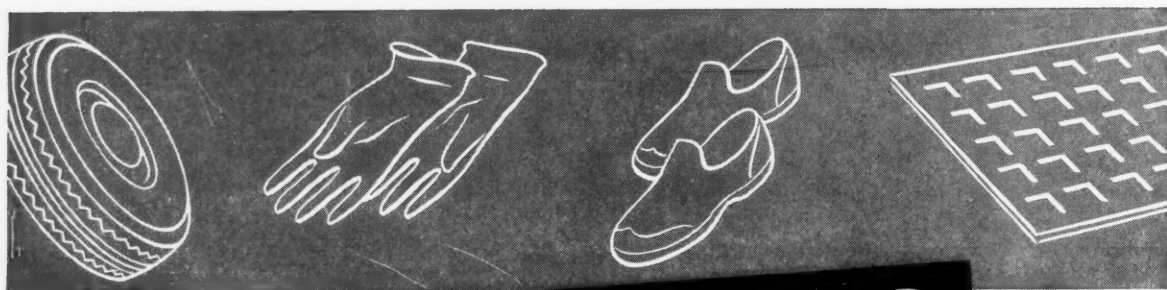


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Did you know that the Pittsburgh Coke & Chemical Company now produces plasticizers too? Pittsburgh PX Plasticizers are just one of the groups of basic products we're supplying to the important plastics industry. Many of the coal chemicals which we produce—phenol, cresol, benzene and phthalic anhydride, to name just a few—are vital to the production of

plastics, rubber and protective coatings for both peacetime and military production.

When you see the Pittsburgh Coke & Chemical Company name or trademark, remember that they represent a basic, integrated organization supplying industry and agriculture with a wide and diversified family of useful products.

### OFFICES:

New York • Chicago • St. Louis

Tulsa • Houston

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W&D 3464



PLASTICIZER DIVISION

**PITTSBURGH**  
**COKE & CHEMICAL CO.**

Grant Building • Pittsburgh 19, Pa.

# Freedom

FROM "STICKY" PRODUCTION  
PROBLEMS—



with G-E SILICONE MOLD RELEASE  
AGENT 81161

Rubber molders have seen G-E 81161 on the job—and they've seen impressive results. This remarkable silicone emulsion speeds production . . . gives even release that prevents pocketing . . . steps up product quality. G-E 81161 can cut down rejects from 15% to 25%! There are good reasons for all this—these important advantages which G-E 81161 offers you . . .

- **Excellent Mold Coverage**—G-E 81161 gives outstanding performance on intricate molds.
- **Stability at Higher Temperatures**—G-E 81161 remains stable at temperatures up to 150 F.
- **Stability under Mechanical Working**—G-E 81161 won't break or cream under repeated recycling in centrifugal pumping systems.
- **Hard Water Stability**—G-E 81161 remains stable 24 hours at 1½% dilution in water of over 200 P.P.M. hardness.
- **Many Other Advantages**—G-E 81161 will not stain light-colored stocks, is rust-inhibited, has low toxicity, and gives outstanding performance in numerous other ways.

Laboratory tests and practical use by many of the largest rubber companies have proved these advantages for G-E 81161. We suggest you try it yourself. Chemical Department, General Electric Company, Pittsfield, Massachusetts.

For details, write to Section P-3, General Electric Company, Waterford, New York. (In Canada: Canadian General Electric Co., Ltd., Toronto.)



Smoother finished rubber buttons are obtained through the even release provided by G-E 81161.



Tires are easily released untorn, unscratched—thanks to G-E 81161, which prevents pocketing.

Silicones for the Rubber Industry

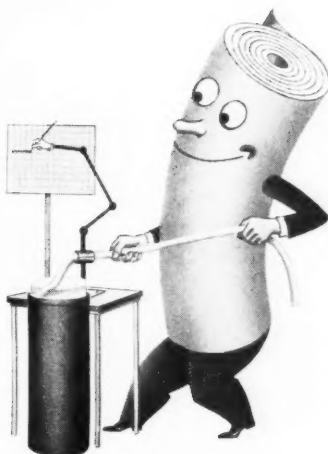
GENERAL  ELECTRIC

# UNIFORMITY

Makes the Big Difference  
in INDUSTRIAL  
Fabrics



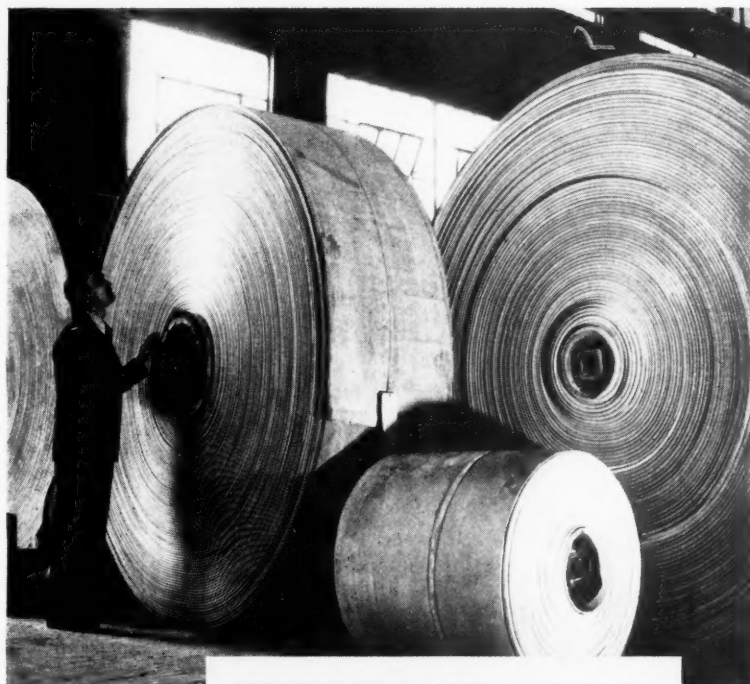
Give You Greater Fabric Uniformity



The greater uniformity of Mt. Vernon fabrics means consistent quality in your finished products—smoother, more efficient fabrication.

#### AT YOUR SERVICE

Mt. Vernon-Woodberry's staff of textile engineers is available on request to help you with your problems in development or application of industrial fabrics.



*Mt. Vernon-  
Woodberry Mills*

**TURNER HALSEY**

COMPANY

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40 WORTH ST. • NEW YORK

Branch Offices: Chicago • Atlanta • Baltimore

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**CHECKING EVEN-  
NESS OF SLIVER  
WITH LINEAR REGU-  
LARITY TESTER.** One of a series of laboratory controls throughout production to assure fabric uniformity in all Mt. Vernon-Woodberry products.



# SUBLAC

non-scorching

# RESIN

a  
synonym  
for  
saving

**SUBLAC** Resin B-2-A, a white powder, is the lowest priced, non-scorching reinforcing resin available today!

**SUBLAC** Resin is outstanding in its ability to impart desirable characteristics to rubber compounds. For example, it may be used to obtain any of these properties: Hardness, Stiffness, Abrasion Resistance, Tear Resistance, Oil Resistance. In many cases, the use of **SUBLAC** Resin alone is sufficient to obtain a combination of several of these properties and at the same time provide a compound with easy processing characteristics and a high general order of physicals. *In addition, **SUBLAC** Resin is non-scorching!*

**SUBLAC** Resin B-2-A is especially advantageous in stocks highly loaded with clay, whiting, or Silene. The following compounds are representative of such highly loaded, easy processing stocks that require no 'trick' mixing techniques:

#### Experimental Slab Stock

GR-S 521 .....	100
SUBLAC Resin B-2-A ....	30
Circo Light .....	35
ZnO .....	5
DPG .....	.15
Altax .....	2.13
Hard Clay .....	300
Sulfur .....	3.70

#### Experimental Tile Stock

GR-S 521 .....	100
SUBLAC Resin B-2-A ....	30
Circo Light .....	15
ZnO .....	5
DPG .....	.5
Altax .....	2.13
Hard Clay .....	200
Whiting .....	150
Sulfur .....	8

Cure 10' @ 320° F.

Tensile .....950

Elongation .....450%

Shore Hardness (A Scale) ..97-98

Shore Hardness (D Scale) ..60-61

In these compounds, the **SUBLAC** Resin was added to the rubber, then enough clay to take up all of the oil, followed by the remainder of the ingredients in the usual manner.

**SUBLAC** Resin B-2-A is readily available.

*Send for your sample today!*

Prices

29½c lb. in truck loads  
30c lb. in lesser quantities  
fob factory in fiber drums

## THE POLYMEL CORP.

1800 Bayard Street  
Baltimore 30, Maryland  
Phone: PLaza 1240

# JOHNSON Rotary Pressure JOINTS

## Answer All Stuffing Box Problems...

This interesting "double feature" installation shows two types of Johnson Joints on one plastic calender. It's a good example of how the use of Johnson Joints is spreading throughout the rubber and plastics industry — for every job that involves getting heating or cooling agents in or out of calenders, dryers, or similar machines.

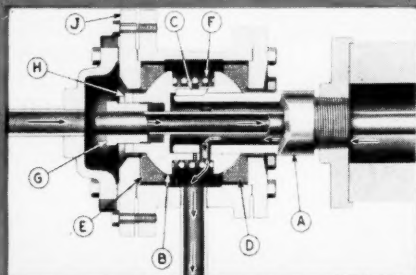
All types of Johnson Joints are completely packless, self-lubricating, self-adjusting. Compared with ordinary stuffing boxes or steam fits they can quickly pay their own way out of savings in maintenance alone. And they boost operating efficiency, stretch valuable man-hours and reduce machine shut-down in the bargain.

### TYPE S JOHNSON JOINT

#### Completely Self-Supporting

Here is the final answer for use where considerable lateral movement of rolls is encountered. The Type S shifts with the rolls, cannot get out of alignment. Installation shows the Type S-BB, which has inlet and outlet in same vertical plane to permit head lugs for stop rods to keep joints from turning. Cross section view shows Type S-B2, which offers alternate arrangement of inlet and outlet.

Nipple (A) is connected to roll. Carbon-graphite seal ring (B) rotates against convex surface of collar (C). Guide (D) supports the joint, is also of self-lubricating carbon-graphite. Spring (E) is for initial seating only; in operation the joint is actually pressure-sealed.

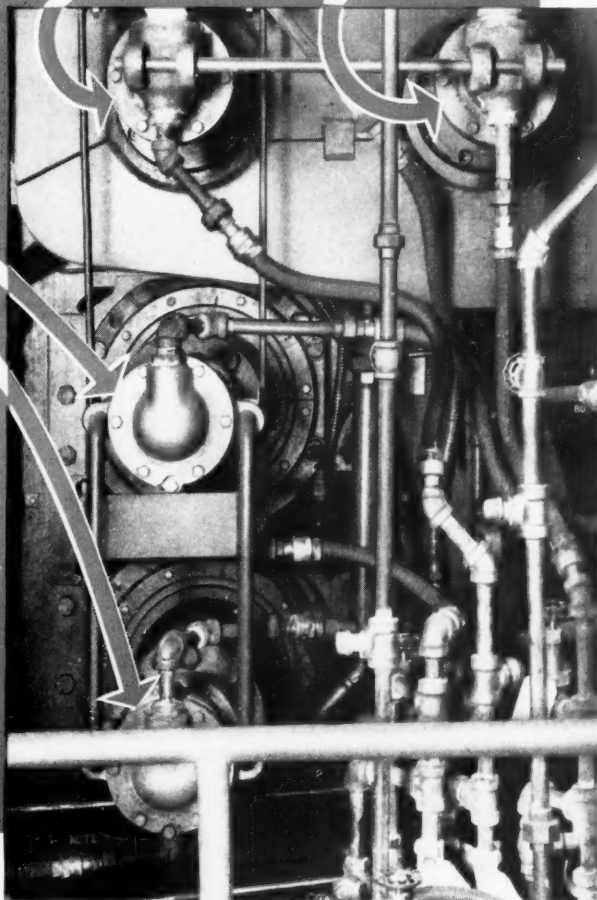
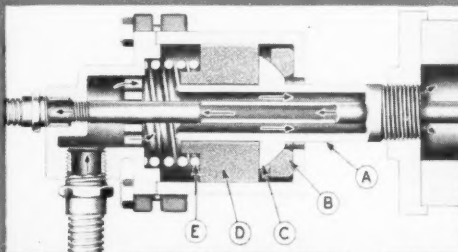


### TYPE N JOHNSON JOINT

#### For Rotating Internal Pipe

The Type N is used where an internal distribution or removal pipe must rotate with the roll — makes the internal pipe an integral part of the joint rotating assembly. Inlet is at end of joint, outlet in side; or connections can be reversed. Installation shows Type L-NA Joint which has lugs cast on side of body for rod support; note how joints are tied together, and both suspended from above. Cross section view shows alternate horizontal inlet or outlet.

Nipple (A) is connected to roll. Sliding collar (B) is keyed to nipple at (C), but fits loosely so pressure can fill housing and press carbon-graphite seal rings (D) and (E) against collars. Spring (F) is for initial seating only. Note packing gland (G), with lock nut (H), which permits longitudinal movement of internal pipe. Assembly plate (J) permits removal of head and internal pipe without dismantling joint.



Most machinery manufacturers furnish Johnson Joints as standard equipment. Write today for all the facts.



Products of The **Johnson Corporation**

869 Wood St., Three Rivers, Michigan

Rotary Pressure Joints • Compressed Air Separators and Aftercoolers  
Direct Operated Solenoid Valves • "Instant" Steam Water Heaters

TEAR RESISTANCE PROPERTIES OF AMERICAN PROCESS ZINC OXIDES



# ACTIVATOR

BY WEIGHT ON 100 PARTS OF RUBBER

• PROTOX 166

○ NORMAL AMERICAN PROCESS ZINC OXIDE

COMPOUND

SMOKED SHEET 100.00

SELF 3.38

MB 1.50

THERM 0.75

STEARIC 1.50

ZINC OXIDE VARIABLE

CURE 45 MIN./274 F.

A supplement to THE ACTIVATOR—the house organ issued by The New Jersey Zinc Company for over 15 years to aid the Rubber Industry in its use of Zinc Oxide.

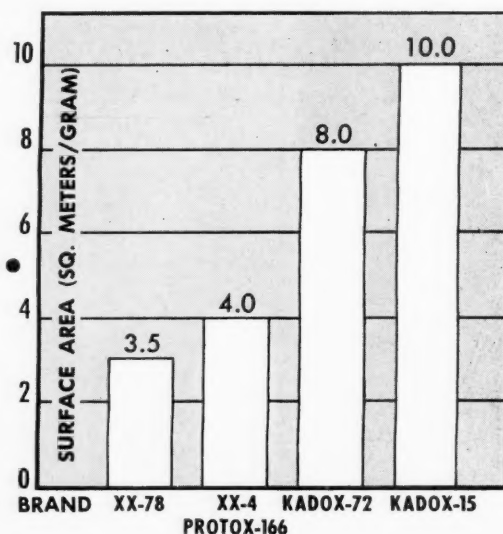
## New Surface Area Values for HORSE HEAD ZINC OXIDES

THE surface areas of the various brands of Horse Head Zinc Oxides, when measured by the  $N_2$  adsorption method,\* are from 30% - 65% larger than those derived from the electron-micrograph count method. The latter were previously reported in the March, 1949, issue of THE ACTIVATOR.

These findings stem from our extensive application of the  $N_2$  adsorption method to a family of Zinc Oxides. Moreover, they represent an extension of the studies our Research Laboratories have been conducting on pigments for over thirty years.

Why the higher values? The  $N_2$  adsorption method inherently measures the area of all particles; the count method estimates area through calculations based on length and width of a few hundred particles.

The new values for surface area are significant, as they accord more closely with the known processing and compounding properties of the individual Horse Head Zinc Oxides:



\*Brunauer, Emmett and Teller, J. Amer. Chem. Soc. 60, 309 (1938).

### THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments  
... most used by rubber manufacturers since 1852

160 Front Street, New York 38, New York



# What's the *"Rub"* in your Rubber Products Problem?

...Perhaps Flintkote Research and Development have found the answer to your special needs, too!

Sometimes, in adhesives, coatings or sealers, *just a little difference makes all the difference in the world.*

And, finding that important difference may give you exactly what you are looking for in fabricating, compounding or processing. We have done just that for many manufacturers.

But first of all, investigate Flintkote's wide line of both aqueous and solvent types of compounds: cements, sizings, laminates, saturates, coatings and sealers. We may well have the product you need.

If not, if your requirements *do* turn out to be extra special—our trained research staff will welcome the opportunity to work with you—whether you want drum or carload quantities . . . rubber and resin formulations. Simply write:

THE FLINTKOTE COMPANY, Industrial Products Division  
30 Rockefeller Plaza, New York 20, N. Y.

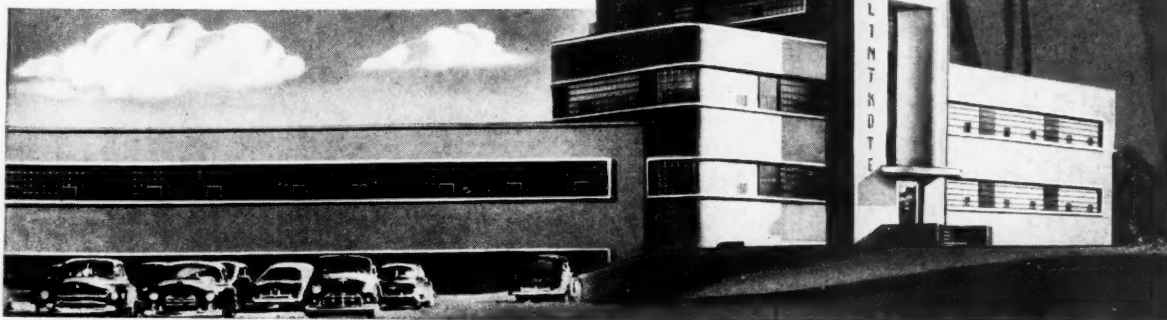
Atlanta • Boston • Chicago Heights • Detroit • Los Angeles  
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The Flintkote Company of Canada, Ltd.  
30th Street, Long Branch, Toronto, Canada



## FLINTKOTE *Products for Industry*

FLINTKOTE RESEARCH LABORATORY



# HOW TO INCREASE YOUR R

## NEW PROCESS PROVIDES ECONOMICAL RECLAIM OF ALMOST ANY NATURAL, GR-S OR BUTYL SCRAP

With present shortages, and the uncertainties of the outlook for the future, no material containing rubber should be burned or thrown away before investigating its reclaiming possibilities. Today, practically all types of factory waste or scrap can be economically reclaimed and added to your supplies.

The Banbury Rubber Reclaimer and Devulcanizer now makes it possible to reclaim completely cured, partially cured or scorched stocks, and uncured trimmings, either separately or together, in one simple operation. The Banbury introduces mechanically induced heat and a working action at the same time. High speeds and high ram pressures result in high-temperature devulcanization.

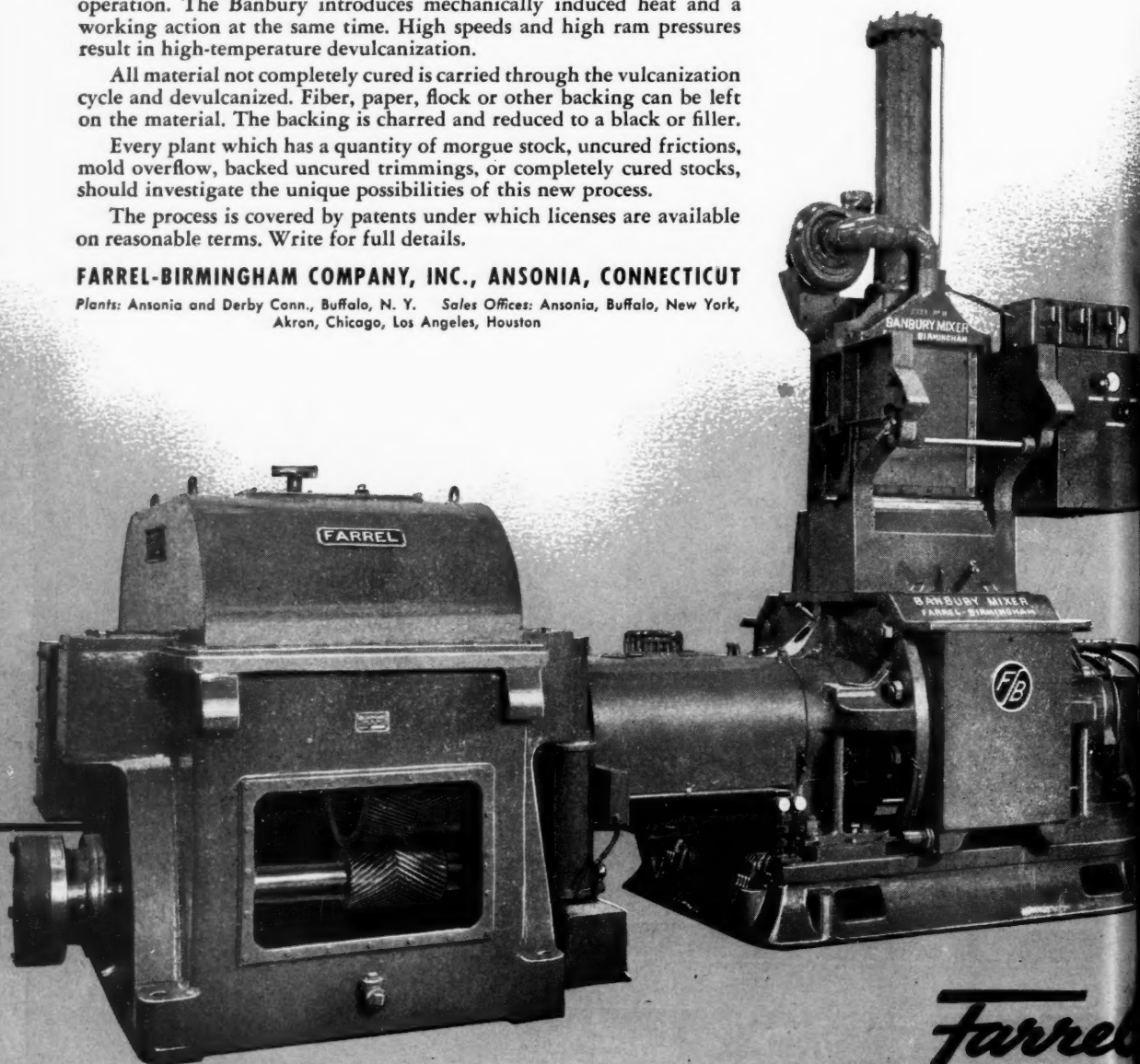
All material not completely cured is carried through the vulcanization cycle and devulcanized. Fiber, paper, flock or other backing can be left on the material. The backing is charred and reduced to a black or filler.

Every plant which has a quantity of morgue stock, uncured frictions, mold overflow, backed uncured trimmings, or completely cured stocks, should investigate the unique possibilities of this new process.

The process is covered by patents under which licenses are available on reasonable terms. Write for full details.

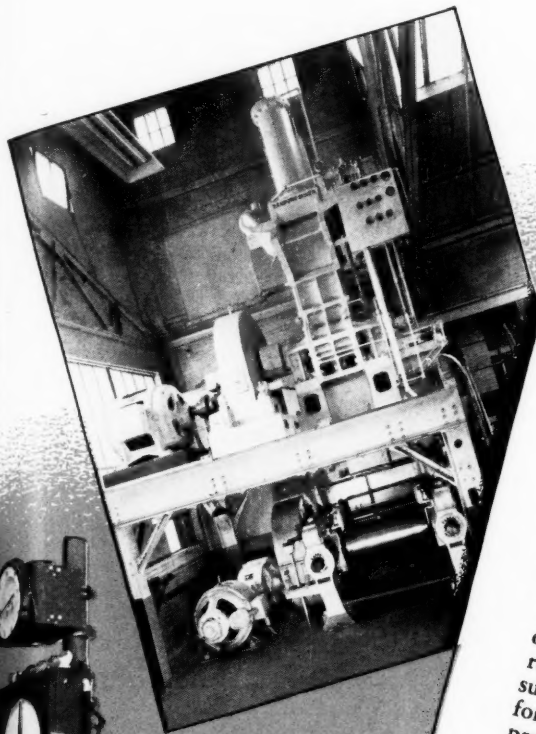
**FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONNECTICUT**

Plants: Ansonia and Derby Conn., Buffalo, N. Y. Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston



*Farrel Bir*

# RUBBER SUPPLY



The size 11 Banbury Rubber Reclaimer and Devulcanizer processes from 3000 to 5000 lbs. per hour. It is of sturdier construction than the standard mixer to allow for the heavier load requirements. It has a Uni-drive, high-pressure, self-sealing dust stops, and several other features essential to the process.

## A RECOMMENDED SETUP FOR PRODUCING HIGH QUALITY RECLAIM

For economical reclaiming in the factory, we recommend a size 3A Banbury Reclaimer and Devulcanizer with Uni-drive, installed over a 60" mill, and with a 24" and 26" x 48" high-speed refiner adjacent to the mill. While it is often possible to load the scrap into the Banbury without cracking or other preparation, for ease of loading as well as a means of removing scrap metal, we recommend a cracker with the material passing over a magnetic pulley before going into the Banbury.

This layout is proposed after extensive tests carried on over the last few years, and the careful examination of the results provided by a number of recent installations. With such a setup, we have found that it is a simple procedure for the compounder to blend a variety of scraps together, producing a finished reclaim that is exactly what he needs for a particular purpose.

The figures given below are based on the following assumptions:

- Power cost . . . . . 1¢ per horsepower hour
- Labor cost . . . . . \$1.65 per man per hour
- Banbury output . . . . . 1000 pounds per hour (this is a conservative figure)

Power Cost			
	Per Hour	Cost Per Pound	
Banbury (250 HP)	\$ 2.50	\$0.0025	or ¼¢
Mill (125 HP)	1.25	0.00125	or ⅛¢
Refiner (200 HP)	2.00	0.0020	or ⅙¢
Miscellaneous (125 HP)	1.25	0.00125	or ⅛¢
<b>Labor Cost</b>			
2 Men @ \$1.65 per hour	3.30	0.0033	or ⅓¢
<b>Totals</b>	<b>\$10.30</b>	<b>0.0103</b>	<b>1 ⅓/100¢</b>

**NOTE**—Adjustments should be made for any differences in local power and labor costs. Add cost for "Overhead". No cost has been allowed for stock preparation as this is not always required.

**Birmingham®**



We've got a much  
bigger plant  
now!

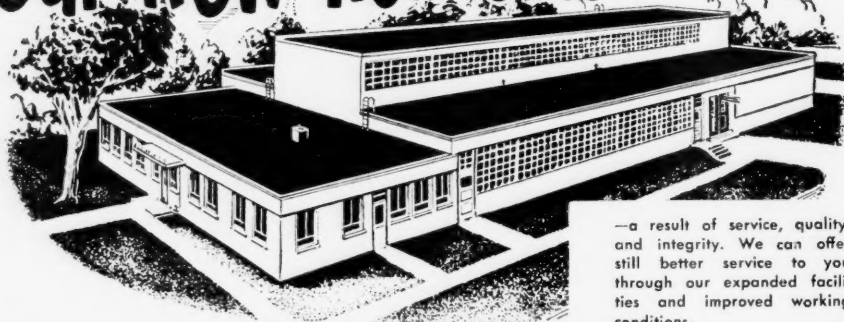
Our new location provides enlarged facilities for the manufacture of the "MARK" series of vinyl stabilizers and VINYLUM aluminum powder dispersions.

We now have increased laboratory facilities for assistance to customers in solving their allied problems for research and development of new products and for control of product quality.

**ARGUS CHEMICAL LABORATORY**  
633 COURT STREET, BROOKLYN 31, N. Y.



## Our New Home...



—a result of service, quality, and integrity. We can offer still better service to you through our expanded facilities and improved working conditions.

Electrical Equipment for

**CALENDERS • EXTRUDERS • MILLS • BANBURYS • CONVEYORS**

**ELECTRICAL AND MECHANICAL ENGINEERS**

**ALL EQUIPMENT—NEW or USED—FULLY GUARANTEED**

**CONTROLS • MOTORS • REDUCERS • MOTOR-GENERATOR SETS**

# THE A-C SUPPLY COMPANY

P. O. BOX 991

AKRON, OHIO

1100 HOME AVE.

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SERVICE

QUALITY

DEPENDABILITY





# **SHELL DUTREX 6**

- **Plasticizer and Extender for  
GR-S Tire Treads, Footwear  
and Mechanical Goods**
- **Chemically and Physically Controlled**



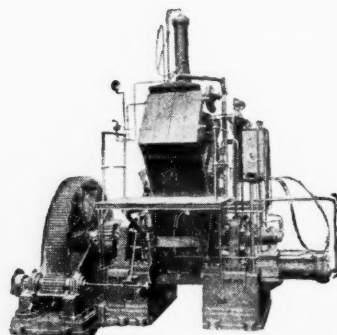
**SHELL OIL COMPANY**

50 WEST 50th STREET, NEW YORK 20, N. Y.  
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

FIRST IMPRESSIONS ARE LASTING...

When an experienced rubber engineer looks at a SHAW Machine, he can see at a glance that there are many advanced features which contribute to high production of first-class goods. But after long usage he will know that it is equally notable for trouble-free operation with low maintenance costs.

**SHAW**



★ The machine illustrated is the well-known Shaw Intermix

**FRANCIS SHAW & COMPANY LIMITED, MANCHESTER 11, ENGLAND**

MANUFACTURED FOR U. S. A. UNDER LICENSE BY ADAMSON UNITED COMPANY, AKRON, OHIO.

R196

**IF YOU WANT TO**

**INCREASE STRENGTH**

**OF YOUR LATEX ADHESIVES**

**For example:** Du Pont "Ludox" colloidal silica increased—up to three times—bond strength of natural rubber and neoprene adhesives designed for use in fabrics-to-fabric and leather-to-leather adhesion. "Ludox" also increases bond strength of latex to such materials as glass, metal, and highly sized cotton flannel.

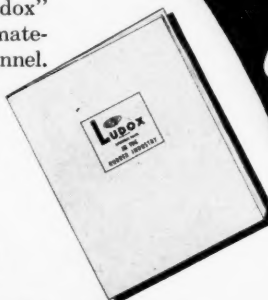
**"Ludox" also improves other latex products**

- ★ Increases stiffness of neoprene latex thread
- ★ Reduces solids required in neoprene latex foam
- ★ Increases toughness of latex coatings
- ★ Reduces tack of coating materials
- ★ Adds stiffness to films
- ★ Use combination of these effects for better products—New applications.



BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

**GET THE FACTS  
ON LUDOX®**  
COLLOIDAL SILICA



**New Technical Bulletin**

shows how you can use Du Pont "Ludox" colloidal silica in your latex products. Write: E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, IRW-4, Wilmington 98, Delaware.



## ***Your Problems of Supply Concern Us, Too . . .***

Our organization, even as yours, lives by selling . . . Your supply problems, as a customer, are our supply problems, as a supplier . . . Neither of us can properly appraise a supply situation except as it affects us mutually. We make every effort possible to furnish materials in the quantity and at the time needed. Unexpected changes in your own scheduling may create problems difficult to anticipate . . . We will do our utmost in helping you meet such problems when you place them before us . . . If it is impossible to secure some of the materials you have been using, perhaps our Technical Representatives can help you with substitutions that will serve as well or better.

*Our Technical Representatives are ready to answer your call from any of the strategically located branches shown in the map above.*



# **HARWICK STANDARD CHEMICAL CO.**

**AKRON 8, OHIO**

**BRANCHES: BOSTON, TRENTON, CHICAGO, LOS ANGELES**

## **PRODUCTS:**

### **SYNTHETIC RESINS:**

Para Coumarone Indenes,  
Hydro-Carbon Terpenes,  
Piccolastics, (Styrenes) . . .

### **COLORS:**

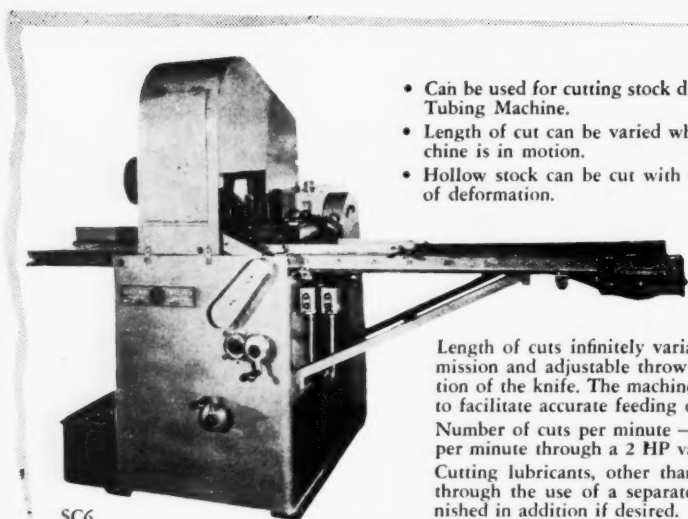
Plastic dispersed, Dry Powder,  
Rubber Inks . . .

### **SOFTENERS:**

Resinous, Liquids . . .

### **FILLERS:**

Silene EF, Clays, Whittings  
. . . Etc.



SC6

- Can be used for cutting stock directly from Tubing Machine.
- Length of cut can be varied while the machine is in motion.
- Hollow stock can be cut with a minimum of deformation.

*First Choice*

FOR  
cutting cured and uncured  
rubber stocks

Length of cuts infinitely variable through a positive variable transmission and adjustable throw eccentric, synchronized with the operation of the knife. The machine is equipped with driven stripper belt to facilitate accurate feeding of the stock.

Number of cuts per minute — infinitely variable for 20 to 160 cuts per minute through a 2 HP variable speed main drive.

Cutting lubricants, other than water, can be economically applied through the use of a separate recirculating unit which can be furnished in addition if desired.

The Stock Cutter shown is completely equipped with the following driven conveyors:

- 6 ft. long 12" wide input conveyor and top snubber roll.
- 3 ft. long 12" wide take-off conveyor.

Machine is equipped with anti-friction bearings throughout, and all gears and drives units are completely enclosed and run in oil for efficient lubrication.



**BLACK ROCK MFG. CO.**

175 Osborne Street

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Pacific Rep. Lombard Smith,  
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NEW YORK & EXPORT OFFICE  
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**TANNEY·COSTELLO**  
INCORPORATED

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CRUDE RUBBER  
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PLASTICS &  
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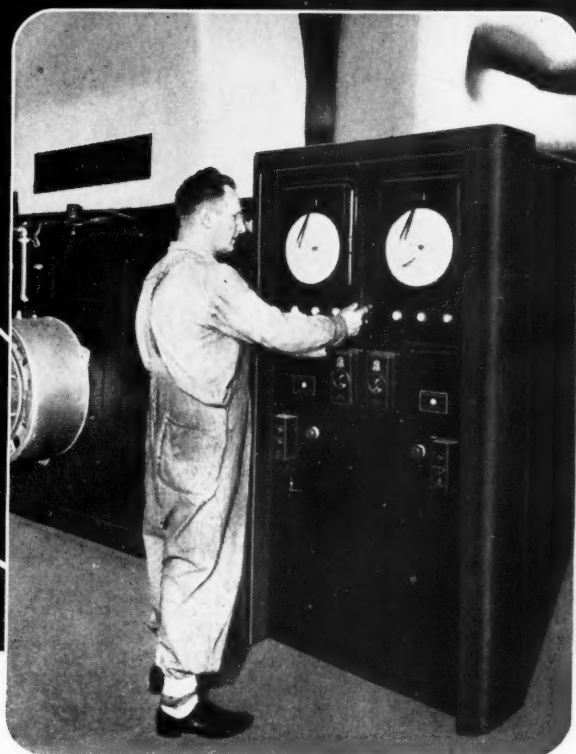
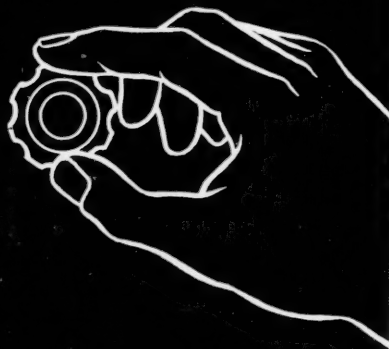
REPRESENTATIVES FOR:

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Rubber — Natural and Synthetic  
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# 10,000 Pounds Constant Tension

*under fingertip  
control...*



*... in this*

## IOI Nylon Tire Fabric Latexer

Complete one-man process control is but one of the many outstanding advanced-design features of this IOI latexing machine. Here are just a few of the others:

- Simultaneous impregnation, drying and attenuation of the cords, resulting in pre-stretched tire fabric that requires no further processing prior to calendering.
- Direct gas-fired heating, under complete control, provides the correct high temperature required for the most efficient rate of drying either woven or weftless fabric.
- Rugged in construction, yet extremely flexible in operation, with constant-tension control at all speeds.
- Units available in various capacities, from small production machines up to high speed calender train installations.
- These machines require very little cleaning and a minimum of house-keeping maintenance.

*An Industrial Ovens engineer will be glad to call at your convenience to discuss the application of this machine to your particular latexing requirements.*

### INDUSTRIAL

13825 TRISKETT ROAD



### OVENS, INC.

CLEVELAND 11, OHIO



Yes, CRYSTEX is 85% insoluble in carbon bisulphide and, on a per unit basis, it is the most economical insoluble sulphur on the market today. Remember, when you're next in the market for insoluble sulphur, first check the prices, then check the percentages of insoluble sulphur. By this per unit comparison, CRYSTEX is more economical and many users find that its use gives them a better product.

Write today for a generous testing sample and a copy of our CRYSTEX Insoluble Sulphur Circular.

#### OTHER RUBBERMAKERS' CHEMICALS

Commercial Rubbermakers' Sulphur  
Tire Brand, 99½% Pure

Refined Rubbermakers' Sulphur,  
Tube Brand

"Conditioned" Rubbermakers' Sulphur

Carbon Tetrachloride • Carbon Bisulphide

Caustic Soda • Sulphur Chloride

Flowers of Sulphur 99½% Pure  
(30% Insoluble in CS<sub>2</sub>)



*Stauffer*

**CHEMICAL CO.**

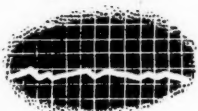
420 Lexington Avenue, New York 17, N. Y. • 221 North LaSalle Street, Chicago 1, Ill.  
824 Wilshire Boulevard, Los Angeles 14, Cal. • 636 California St., San Francisco 8, Cal.  
424 Ohio Bldg., Akron 8, O. • Apopka, Fla. • N. Portland, Ore. • Houston 2, Tex.  
Weslaco, Tex.

dependable



## PEQUANOC reclaimed rubber

... has been used by experienced rubber compounders for half a century—



...to minimize price fluctuations in compounding costs



...to achieve more uniformity in processing, curing, and quality



...to get faster and better mixing at lower cost



...to make sure of a dependable domestic source of rubber hydrocarbons.

Periodic shortages and high prices of raw rubber do not worry manufacturers that have always depended on **PEQUANOC** reclaims.

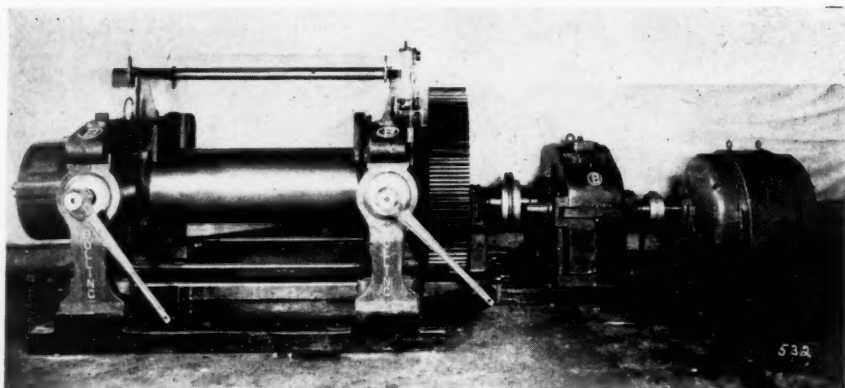
# PEQUANOC RUBBER CO.

QUALITY RECLAIMS FOR SPECIFIC PURPOSES

MAIN SALES OFFICE and FACTORY: BUTLER, NEW JERSEY

## HEAVY DUTY RUBBER MILLS

10 FRAME SIZES—7" to 84" ROLLS  
Standardized, up-to-date designs for every milling or  
sheeting requirement. Modern compact floor level drives.  
STURDY — DEPENDABLE — ECONOMICAL



Frame #7 — Heavy Duty 60" Mill, Floor Level Drive

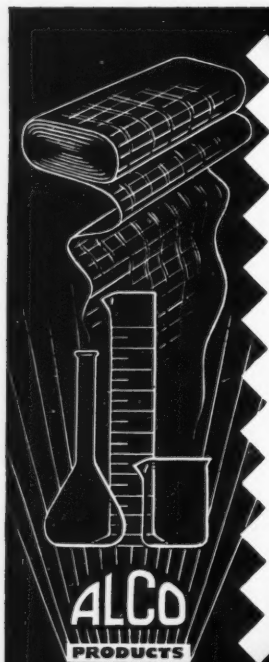
**(B) STEWART BOLLING & COMPANY INC. (B)**

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Cleveland 27, Ohio

Tel.: Michigan 1-2850

MILLS • INTENSIVE MIXERS • CALENDERS • REFINERS • CRACKERS • GEARS  
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A Group of Latex Compounds for Sizing, Coating and  
Impregnating Textile Fabrics.

## ALCOGUM

Synthetic Thickeners for Latex Compounds.

## VULCARITE

Dispersions of Latex Compounding Chemicals.



Technical information and samples available  
promptly upon request.

\*Registered Trademark

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SOUTHERN DISTRIBUTORS  
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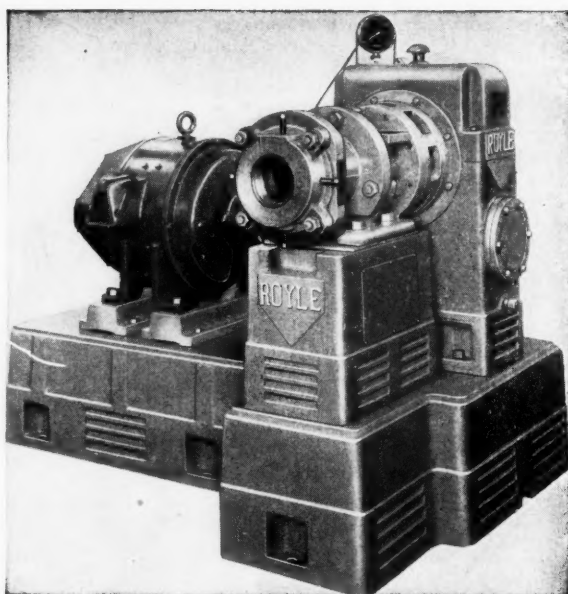
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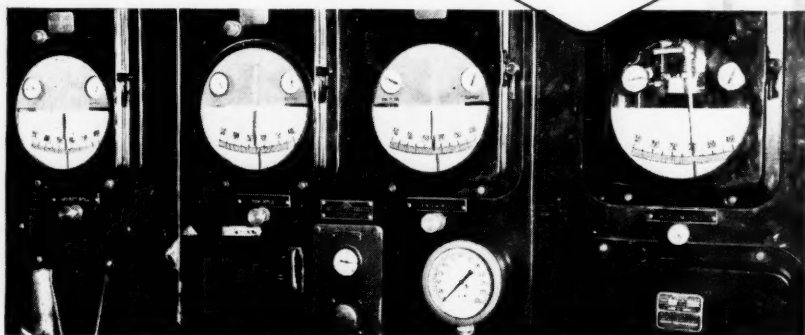
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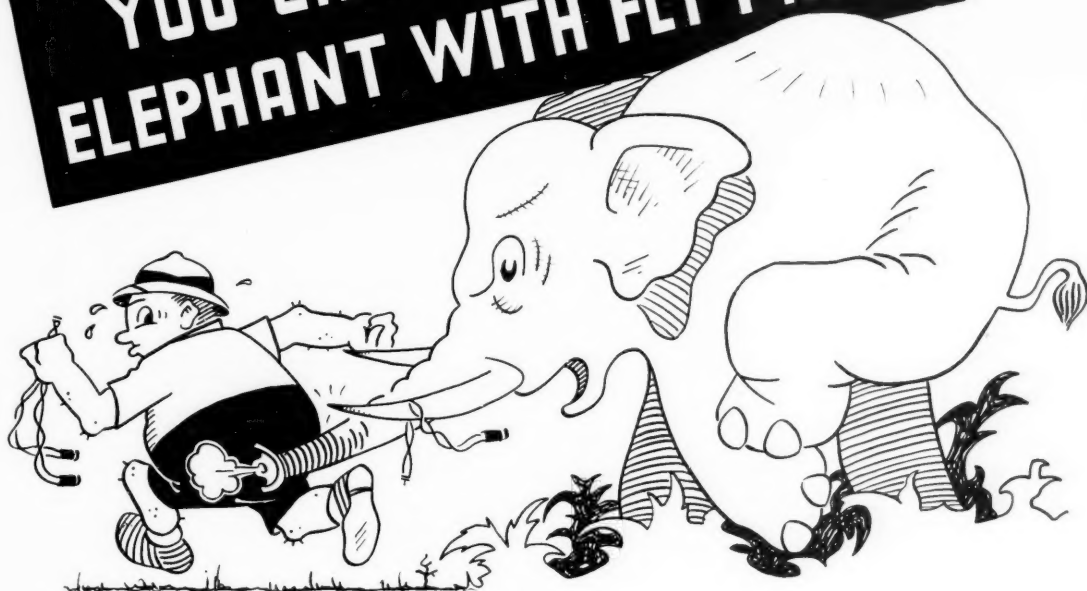
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**MAY, 1951**

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# INDIA RUBBER WORLD

VOL. 124 — NO. 2

MAY, 1951

## High-Quality Reclaim Obtained at Low Cost with New Mechanical Process

D. A. Comes<sup>1</sup>

**T**HE important thing at the present time is to increase our rubber supply—natural or synthetic or reclaim.

In fact, no material containing any rubber of any kind should ever be burned or thrown away. It is all usable and, especially in times like the present, valuable and necessary.

A new mechanical process has been developed for reclaiming natural, GR-S, and butyl scrap at low cost. Known as the Banbury-Lancaster method, this process is covered by three patents: No. 2,221,490 in the name of Thos. Robinson, dated November 12, 1940; Nos. 2,461,192 and 2,461,193 in the names of F. H. Banbury, D. A. Comes, and C. F. Schnuck, dated February 8, 1949. All of these patents are assigned to the Lancaster Chemical Co., 620 Fifth Avenue, New York, N. Y., which, in turn, has entered into an exclusive licensing arrangement with the Patent & Licensing Corp., 30 Rockefeller Plaza, New York.

The Banbury-Lancaster method is built around the newly designed Banbury rubber reclaimer and devulcanizer. This machine is a close relative of the Banbury mixer so well known to the rubber and plastics industries. The reclaimer is of sturdier construction than the standard mixer to enable it to handle the heavier load requirements. It has a Uni-drive, high-pressure, self-sealing dust stops, and several other features essential to the process.

This process is basically one of placing the mass of stock to be reclaimed in a confined working space, subjecting it to intense shearing action by using heavy pressures and high power input. Any fibers present in the scrap are charred and reduced to a non-reinforcing filler. This operation naturally reduces the rubber hydrocarbon content by the proportion of the fiber present, but, if need be, a high rubber hydrocarbon scrap, such as sponge

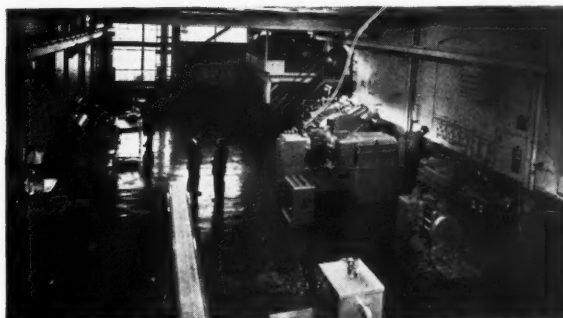


Fig. 1. Continuing Tests of the Banbury-Lancaster Reclaiming Process Are Carried out in the Farrel-Birmingham Process-Testing Laboratory at Derby, Conn.

or tube scrap, can be added to bring the hydrocarbon to the percentage required.

Combinations of natural and synthetic rubber work extremely well by this method, and Neolite or Neolite-type heel and sole stocks make an excellent material for reclaiming in the Banbury. Whenever the word rubber is used in this article, it should be understood to mean the three polymers used in the largest quantities: natural rubber, GR-S, and butyl. Nitrile type rubbers and neoprene do not respond too well to the high temperatures reached in this process.

There are two distinct fields for the Banbury-Lancaster method of reclaiming.

### Reclaiming Factory Scrap

Every factory has a certain amount of trim scrap, partly scorched stock, completely cured stock, and material with a great deal of fiber present, as, for example, uncured calender friction stock. With the Banbury rubber reclaimer and devulcanizer it is now possible to reclaim completely cured, partially cured or scorched stocks, and uncured trimmings, either separately or together, in one simple operation.

Following a relatively easy procedure, the compounder can blend a variety of rubber scrap together, producing a finished reclaim just exactly what he needs for a particu-

<sup>1</sup> Assistant general sales manager, Farrel-Birmingham Co., Inc., Ansonia, Conn.

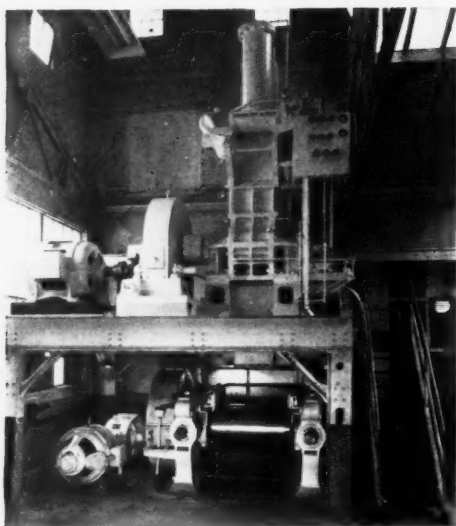


Fig. 2. Size 3A Banbury Rubber Reclaimer and Devulcanizer Installed over Cooling and Sheetting Mill

lar purpose. For instance, one manufacturer reclaims high-grade buff heels and soles combined with some uncured friction stock and some fillers. Some oils are added to the base material, which, in this case, is trimmings from heels and soles. This procedure provides a reclaim that has all the characteristics needed for use in a certain factory compound. The Banbury reclaim actually replaced a commercial reclaim that was costing 10¢ per pound. Another manufacturer is taking 125 pounds of automobile matting scrap and adding to it 35 pounds of latex foam scrap, producing by the Banbury method an excellent grade of reclaim which will again be used in the production of automobile mats.

Established reclaimers are not especially interested in running through small lots of light-colored scrap, as the present-day processes involve large amounts of material to be handled at one time. It is rather difficult and expensive in a large reclaiming plant to process a certain amount of white or some light-colored materials into reclaimed rubber. This type processing is one of the interesting fields for the use of the Banbury rubber reclaimer and devulcanizer. The reclaimed rubber will come out of the machine the same color as the scrap that goes into it, and it is therefore possible to run the unit for a certain designated number of hours on white, then

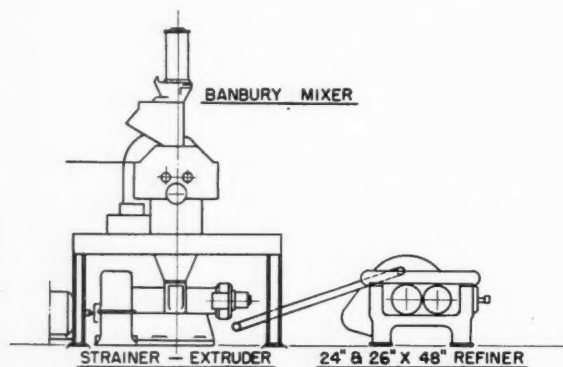


Fig. 3. Reclaiming Unit for Factory Scrap, Consisting of a Size 3A Banbury Rubber Reclaimer and Devulcanizer, Eight-Inch Strainer-Extruder and 24-Inch and 26- by 48-Inch Refiner

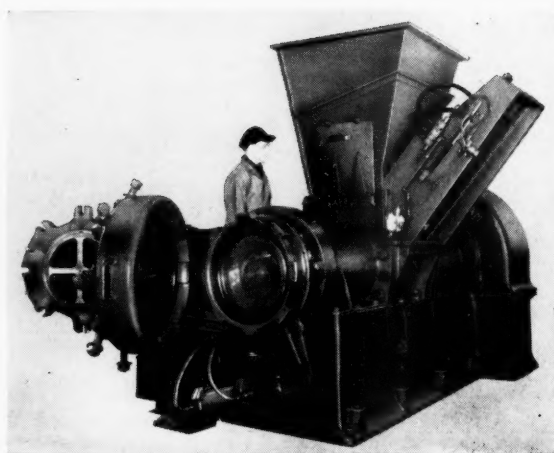


Fig. 4. Extruder with Combination Strainer-Extruder Head and Large Hopper to Receive Batches Directly from the Banbury

light green, gray, light brown, eventually working around to the darker colors or the blacks. It is possible and economical to run individual batches and colors in amounts as low as 150-200 pounds each. In view of the premium paid for light-colored reclaimed rubber, this point is well worth considering.

The reclaiming unit recommended for the rubber manufacturing plant consists of a size 3A Banbury rubber reclaimer and devulcanizer with Uni-drive, installed over a 60-inch mill and with a 24-inch and 26- by 48-inch high-speed refiner adjacent to the mill. (See Figure 2.) It is often possible to load the scrap into the Banbury without any cracking or other preparation. For ease of loading, however, as well as a means of removing scrap metal, it is recommended that a cracker be installed, with the material passing over a magnetic pulley before going into the Banbury. Since the Banbury rubber reclaimer and devulcanizer, by certain easy adjustments, can be used also for regular factory mixing or breakdown of crude rubber, there seems to be little argument against the installation of a unit of this type.

A reclaiming unit now in process of development consists of a Size 3A Uni-Drive Banbury rubber reclaimer and devulcanizer, discharging directly through an enclosed chute into a special eight-inch strainer-extruder; the material from this is taken by conveyer directly to a finishing leafing refiner. This unit of the Size 3A Banbury, eight-inch strainer-extruder and 24-inch and 26- by 48-inch high-speed refiner would give 1,000 to 1,500 pounds of finished reclaim an hour. (See Figures 3 and 4.)

Seven Size 3A Banbury rubber reclaimers and devulcanizers have been sold for this work. They are reclaiming a wide variety of scrap rubber materials, such as No. 1 peels, No. 3 peels, whole tire having all the fiber present, whole tire with fiber removed mechanically, auto mat scrap, sponge rubber, uncured frictions, heel and sole trim, partially cured stocks known as morgue stocks, extruded moldings of all types, etc., etc. In one plant using this process orders have been issued that nothing having rubber in it shall be thrown out or destroyed.

The following cost figures have been arrived at after considerable investigation, using the Size 3A Banbury on many different stocks and combinations of stocks. This estimate is based on the assumed power cost of 1¢ per horsepower hour, labor cost of \$1.65 per man per

hour, and a Banbury output of 1,000 pounds per hour (a conservative figure).

COST—ESTIMATE—BANBURY-LANCASTER RECLAIMING METHOD

Power Cost	Cost	
	Per Hour	Per Pound
Baybury (250 hp.)	\$2.50	\$0.0025 or 1/4¢
Mill (125 hp.)	1.25	0.00125 or 1/8¢
Refiner (200 hp.)	2.00	0.0020 or 1/5¢
Miscellaneous (125 hp.)	1.25	0.00125 or 1/8¢
Labor Cost		
2 men @ \$1.65 per hr.	3.30	0.0033 or 1/3¢
Totals	\$10.30	\$0.0103 1 3/100¢

Adjustments should be made for any differences in local power and labor costs. Add cost for "overhead." No cost has been allowed for stock preparation as this is not always required.

### In the Reclaiming Plant

Existing rubber reclaiming plants in 1950 produced approximately 300,000 long tons and in 1951 will be aiming for 350,000 long tons. The principal scrap used is auto tire, and all standard reclaiming processes remove the fiber. In the Banbury-Lancaster process it would be necessary to remove the fiber by mechanical means. Tests indicate, however, that the fiber can be left in, carbonized, and used as a non-reinforcing filler, and the rubber hydrocarbon replaced by additional scrap with a high rubber content.

A completely new type of reclaiming plant built around the Banbury rubber reclaimer and devulcanizer would be as follows (see Figure 5):

All of the scrap stock (passenger tires, truck tires, etc.) would first pass through a 28-inch and 28- by 42-

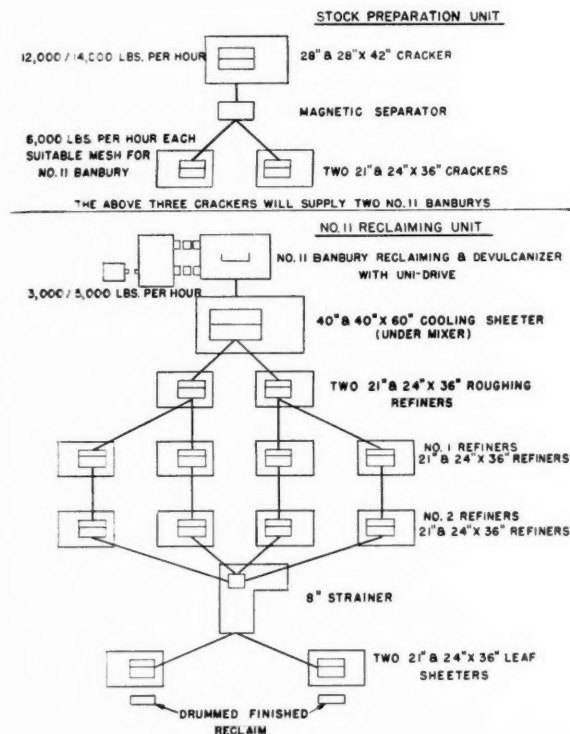
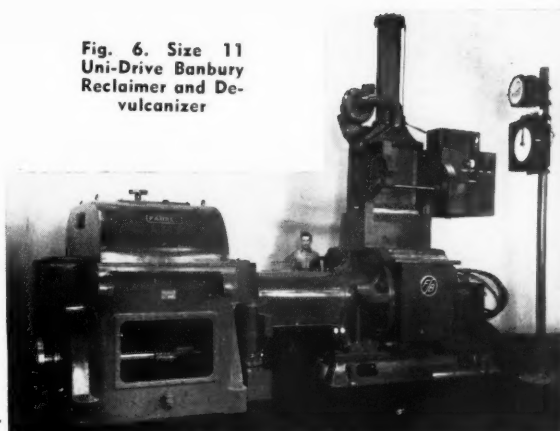


Fig. 5. Diagram of Banbury-Lancaster-Process Reclaiming Plant Built around a Size 11 Banbury Reclaimer and Devulcanizer, Showing the Flow of Stock from the Initial Cracking Operation through the Finishing Refiners

Fig. 6. Size 11 Uni-Drive Banbury Reclaimer and Devulcanizer



inch Uni-drive cracker with a high friction, driven by a 600 hp. motor, which would produce 12,000 to 14,000 pounds per hour of stock down to 1/2-inch mesh. The stock would all pass over a magnetic pulley to remove bead wire and other tramp metal.

The stock would then go to a Size 11 Banbury rubber reclaimer and devulcanizer (Figure 6), where it would be processed in 500-pound batches. The production from the Banbury would be ten batches per hour, or a total of 5,000 pounds. The Banbury would be installed on a mezzanine floor over a 40- by 60-inch cooling sheeter.

From the sheeter the stock would be carried by conveyor to two 21-inch and 24- by 36-inch roughing refiners running at high speed. The material would then be conveyed to four 21-inch and 24- by 36-inch No. 1 refiners, and from them to four No. 2 refiners of the same size. The material would next pass through one eight-inch strainer and then through two 21-inch and 24- by 36-inch finishing and leafing mills.

The stock is transported from one machine to the next by conveyor. The only labor required in the entire setup would be one operator on the large cracker, one on the Banbury, and one on the leafing mills.

Of course, if the fiber must be removed, it would be necessary to put in cracking and air-separating units after the large cracker. As has been previously mentioned, however, it is not necessary to remove the fiber. By this process the fiber is turned into low-grade carbon, and all that is necessary is to add sufficient rubber hydrocarbon to build the total up to the proper percentage.

### Report from South America

To protect the domestic producers of sole leather and rubber soles and also the domestic tanning industry, elastoplastic sheets and plastic shoe soles are now classified separately in the Venezuela customs tariff, and considerably higher import duties have been imposed on these goods.

Tire production in 1949 in Colombia included 138,724 units, of which about 60% were heavy-duty tires. The most important tire factory here used 1,390 tons of rubber last year, for the most part imported, and manufactured 107,584 tires. At the end of 1949 the concern is said to have installed new machinery capable of making 170,000 tires a year, provided government restrictions do not interfere with supplies of necessary materials.

According to reports from the State of Minas Gerais, a new tire factory is being completed in the City of Juiz de Fora. The enterprise, Brazilian owned, and capitalized at 30,000,000 cruzeiros,<sup>1</sup> is expected to produce about 400 tires daily.

<sup>1</sup> Cruzeiro=5.4¢ U. S. currency.

# Effect of Coprecipitation Conditions on Filtration and Properties of Lignin Reinforced GR-S<sup>1</sup>

J. J. Keilen,<sup>2</sup> W. K. Dougherty,<sup>2</sup> W. R. Cook<sup>2</sup>

AS HAS been pointed out previously in the literature, lignin from the waste liquors of the alkaline process for the manufacture of wood pulp is an excellent reinforcing agent for rubber when master-batched or coprecipitated with the rubber<sup>3</sup>. It was shown that tensile strengths equal or superior to those using easy processing carbon black could be obtained. High hardness, high tear resistance, and low abrasion loss are other properties of note. Low modulus and high elongation in combination with high tensile strength and hardness are an unusual set of properties which offers many new possibilities to the rubber compounder.

In addition to its contribution of good physical properties to rubber vulcanizates, particularly GR-S, lignin has the further advantages of being itself light in weight, only 72% as heavy as carbon black, and also of having low coloring value, thus permitting the preparation of colored GR-S compounds of high strength.

The one disadvantage to the widespread use of lignin as a reinforcing agent for rubber is the necessity of coprecipitating it with the rubber from latex. To date this has been such a substantial deterrent that no lignin is now being applied commercially as a rubber reinforcing agent. Numerous attempts to dry mill alkali lignin into various rubbers have given results equivalent only to those obtainable with such fillers as whiting and the large particle-size calcium carbonates.

The reason that lignin is not being coprecipitated or master-batched with rubber commercially, whereas carbon black is, and clay has been, lies in the physical nature of the coprecipitate. The coagulation of a GR-S latex containing suspended carbon black or clay results in a crumb which closely resembles that obtained from the latex alone. The crumb size is large; the particles tend to agglomerate into still larger units, and the crumb is easily strained from the aqueous mother liquor. As opposed to these conditions, lignin coprecipitates are rather fragile, and separation from the mother liquor requires filtration rather than mere straining.

This difficulty in separation of the lignin rubber coprecipitate is not insurmountable. Conditions during the coprecipitation process influence the nature of the crumb obtained, and under the proper set of conditions it appears likely that lignin coprecipitates could be handled in GR-S plants with only slight modification in existing equipment and with little or no sacrifice of total rubber capacity. This report covers a series of experiments which demonstrate the effect of various process conditions on the nature of lignin coprecipitates.

Physical properties of vulcanizates, as affected by the process conditions, are likewise shown.

## Coprecipitation Process

In broad outline, the coprecipitation process consists of slurring the lignin in water and added sodium hydroxide solution. This lignin solution is mixed with the latex in the desired proportions; then the mixture is added to dilute sulfuric acid. The coprecipitate forms immediately and is separated by filtration. The filtered coprecipitate is washed with water to remove residual sulfuric acid, then dried in hot air.

As mentioned above, the separation of the coprecipitate by filtration appears to be the critical operation in the process. The following factors were found to be of some importance in controlling the physical nature of the coprecipitate and thereby its filtration:

1. Premixing of the lignin solution with the latex.
2. Agitation while the lignin-latex mixture is being added to the acid solution and after formation of the coprecipitate.
3. Quantity of acid used for coagulation.
4. Temperature of the acid solution to which the lignin-latex mixture is added.
5. Temperature of heating the coprecipitate after it has been coagulated, but before filtration.

From the evaluation of vulcanizates of lignin coprecipitates made up to this time, a loading of 50 pounds of lignin per 100 pounds of GR-S appeared the most acceptable. Accordingly, the process condition studies were limited to this loading. A series of laboratory experiments was conducted in which the last four of the above factors were studied for their effect on filtration only. Later larger-scale experiments provided sufficient coprecipitate to permit compounding and curing and also permitted an investigation of the effect of premixing. Throughout this study a pine-wood lignin from kraft waste liquor was used. This material is available as "Indulin" from the West Virginia Pulp & Paper Co.

## Laboratory Studies

In the laboratory studies the lignin was prepared as a sodium hydroxide solution containing 25% precipitable lignin. The sodium hydroxide ratio was 160 pounds per 840 pounds of dry lignin. The latex was type I GR-S, containing 27% rubber solids. Sulfuric acid, c.p. was used for coagulation. Quantities of materials were calculated to give a batch of 45 grams. The acid was diluted to 1000 milliliters and heated to the selected temperature. The lignin-latex mixture was added; then the coprecipitate was cooled and filtered on a four-inch buchner funnel using filter paper. The filter cakes were washed with four 1000 milliliter portions of water.

<sup>1</sup> Based in part on work done by J. J. Keilen in partial fulfillment of the requirements for the degree of D.Ch.E. at the Polytechnic Institute of Brooklyn.

<sup>2</sup> Development department, West Virginia Pulp & Paper Co., Charleston, S. C.

<sup>3</sup> J. J. Keilen, A. Pollak, *Rubber Chem. Tech.*, 20, 1099 (1947).  
R. A. V. Raff, G. H. Tomlinson, H. T. L. Davies, W. H. Watson, *Rubber Age* (N. Y.), 64, 197 (1948).

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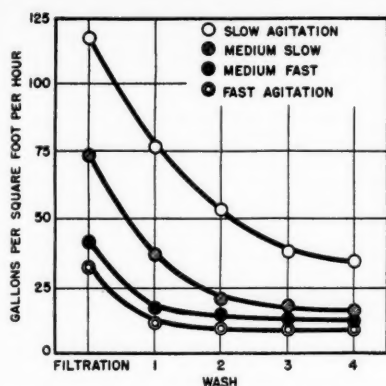


Fig. 1. Effect of Agitation during Coprecipitation on Filtration Rates of Lignin GR-S

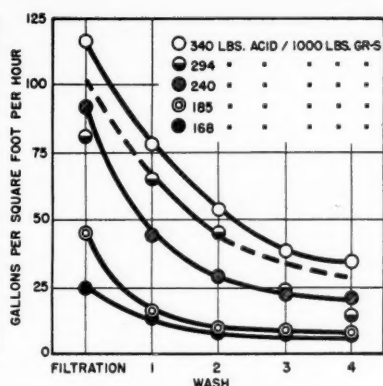


Fig. 2. The Effect of Acid on the Filtration Rates of Lignin GR-S

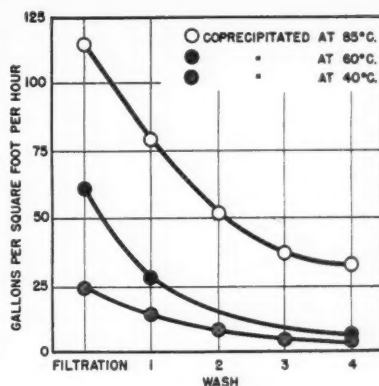


Fig. 3. Effect of Coprecipitation Temperature on Filtration Rates of Lignin GR-S

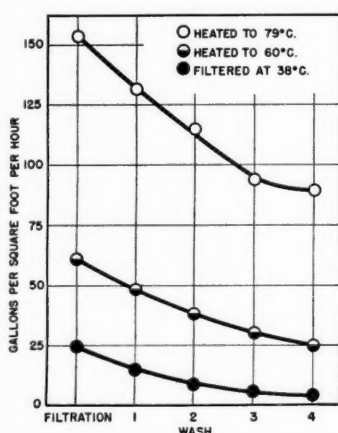


Fig. 4. Effect of Heating after Coprecipitation on Filtration Rates of Lignin GR-S

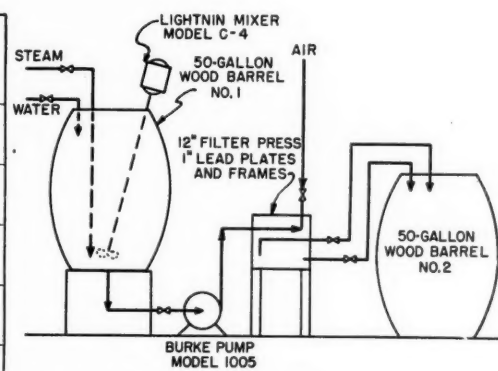


Fig. 5. Lignin-Rubber Coprecipitation Apparatus

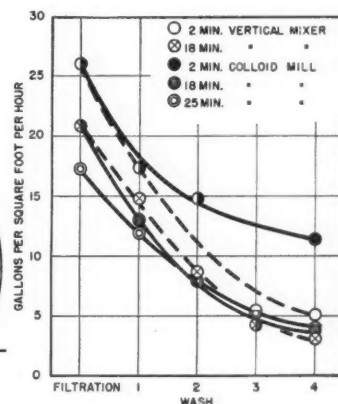


Fig. 6. Effect of Premixing on Filtration Rates of Lignin GR-S

The first condition varied was agitation during the addition of the lignin-latex mixture to heated dilute acid. Although a calibrated agitator was not available, it was possible to get four distinct speeds. Great care was exercised in placing the agitator in exactly the same position in each of these and subsequent experiments. From the volumes of filtrate and wash water and the times required for filtration, rates were calculated in gallons per square foot per hour. The data for the agitation study are represented in Figure 1, from which it is readily seen that slow agitation favors rapid filtration. All further tests were then made with slow agitation.

TABLE 1. RELATION BETWEEN SULFURIC ACID USED ON PH OF LIGNIN GR-S COPRECIPITATES

Pounds 60° Baume Sulfuric Acid per 1000 Lbs. GR-S Solids	pH
340	1.9
290	1.9
236	2.1
183	2.9
166	3.0
149	5.5
137	7.4
124	8.1
83	9.9

The second factor studied was the quantity of sulfuric acid used for coagulation of the lignin-latex mixture. The volume of dilute acid was held constant; so there was a variation in concentration and corresponding variation in pH of the filtrates and of the filter

cakes. Table 1 gives the pH of the filtrates for various amounts of acid. It was found, as shown in Figure 2, that filtration rate is improved by increasing the quantity of acid used. The proportion of 340 pounds of 60° Baumé sulfuric acid per 1,000 pounds of GR-S was used for the above tests.

In preliminary studies of coprecipitation of lignin with GR-S, it had been found that heating of the dilute acid before addition of the lignin latex mixture gave more rapid filtration. Accordingly, three different temperatures were used to verify the earlier conclusion and to study the magnitude of the effect. Since vacuum filtration was visualized, the maximum temperature used was 185° F. (85° C.) Best filtration and washing rates were secured at this temperature, as shown in Figure 3.

Another series of temperature experiments was conducted in which the lignin-latex mixture was added to relatively cool dilute acid, and then heat was applied after the preliminary coagulation had been completed. The further heating resulted in additional agglomeration of the particles, and some clusters as large as 1/4-inch resulted. The maximum temperature reached in this series was 175° F. (79.4° C.), and at this temperature the highest filtration rates, shown in Figure 4, were achieved.

### Process Variables and Properties of Vulcanizates

In order to obtain larger quantities of the materials for compounding and curing, a more or less parallel

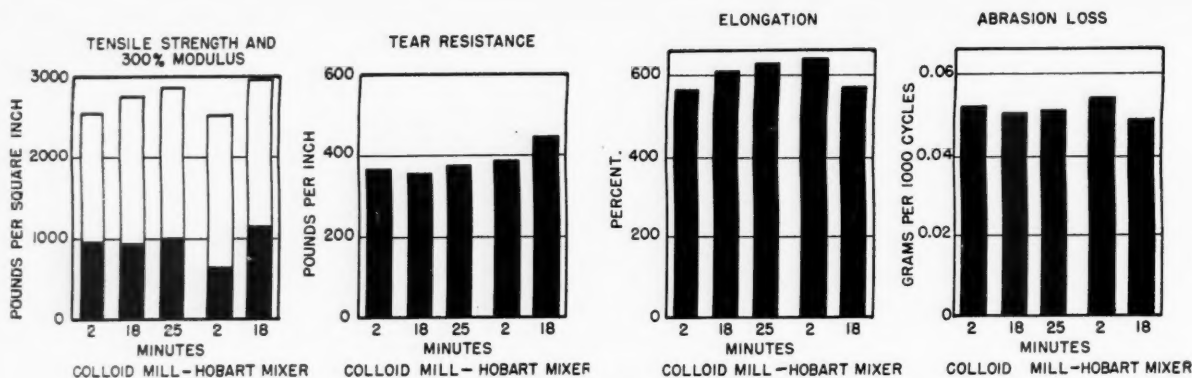


Fig. 7. Effect of Premixing Properties of Lignin GR-S

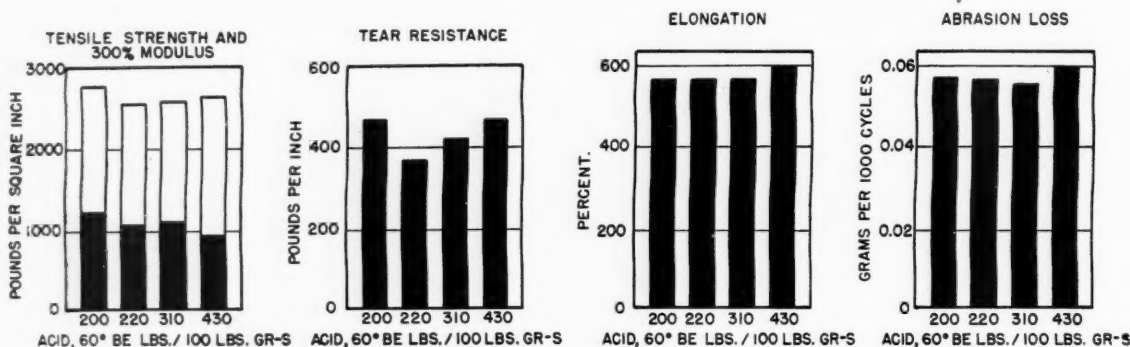


Fig. 8 Effect of Acid Concentration during Coprecipitation on Properties of Lignin GR-S 50

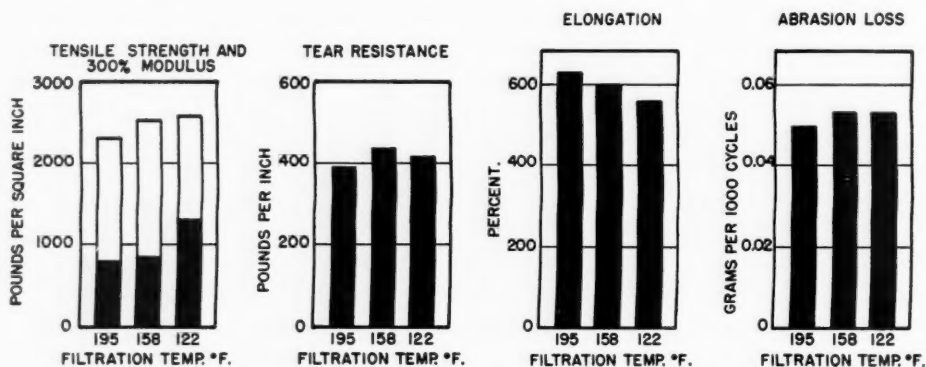


Fig. 9. Effect of Coprecipitation and Filtration Temperatures on Properties of Lignin GR-S 50

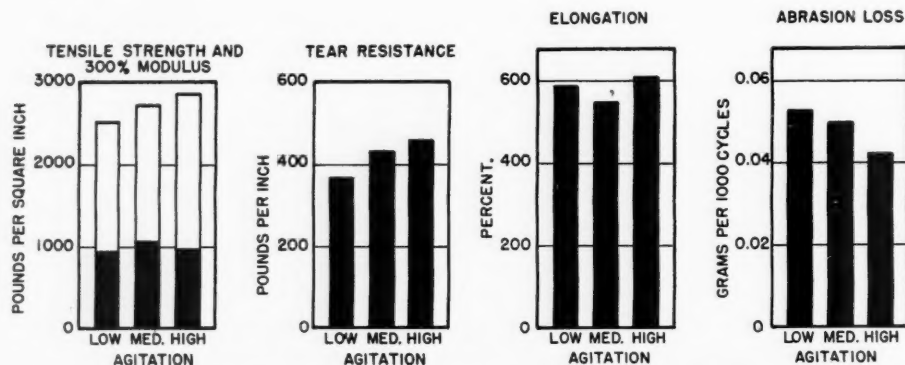


Fig. 10. Effect of Agitation Rate on Properties of Lignin GR-S 50

series of lignin-GR-S coprecipitates was made in a small pilot plant. A diagram of the equipment used is given in Figure 5. Because a vacuum filter of adequate size was not available, the filter press shown in the diagram was used. Owing to the compressible nature of the coprecipitates, filtration rates of the magnitude of those secured in the laboratory were not obtained. The same trends, however, were shown.

Since the effect of premixing of the lignin solution and latex was not studied in the laboratory, it was made the object of the first investigation. Two types of mixers were used—a Hobart vertical mixer of 12-quart capacity with a flat beater, and an Eppenbach colloid mill. In the case of the vertical mixer, the lignin solution and latex were mixed for varying periods of time at a speed low enough to eliminate frothing. With the colloid mill, the mixture was continuously circulated through the mill for the desired periods of time. The same coprecipitation procedure following the premixing was used in each case.

Figure 6 shows the filtration rates for some of the tests that were made. It is readily seen that premixing gives lower filtration and washing rates. It is probably coincidence that the speed of the vertical mixer and clearance of the colloid mill were such as to give the same filtration rates.

Other lignin GR-S coprecipitates were prepared in eight-pound quantities in this pilot plant, varying the quantity of sulfuric acid used for coprecipitation, the temperature of heating after coprecipitation at 86° F. (30° C.), and using several different speeds of agitation during the coprecipitation. After the coprecipitates were washed and dried, they were compounded according to the formula of Table 2, then cured and tested.

Premixing of the lignin solution and latex before coprecipitation gives increases in tensile strength, tear resistance, and abrasion resistance of lignin-GR-S coprecipitate vulcanizates, as seen in Figure 7. This point is true for both types of mixers used in this series of experiments. The differences are not great, but the trends are very definitely present. Although the same trend would appear to be evident in elongation, the accuracy of this test is hardly sufficient to justify a distinction between 570% and 640%, the minimum and the maximum, respectively.

TABLE 2. COMPOUNDING FORMULA

	Parts by Weight
Lignin coprecipitate.....	150
Coal-tar plasticizer.....	8
Zinc oxide.....	5
Benzothiazyl disulfide.....	1.5
Copper diethyldithiocarbamate.....	0.3
Sulfur.....	2.5

Acid used for coprecipitation apparently has very little influence on any of the five properties represented in the bar charts of Figure 8. As might be expected, there is some variation, but no trend is shown.

Temperature of heating after coprecipitation, as with premixing, exerts an effect on tensile strength and other properties. Tensile strength, tear resistance, and 300% modulus all decrease as the temperature is raised. Abrasion resistance, as shown in Figure 9, increases slightly as temperature is raised, but the differences are small, as are those for elongation which shows the same trend.

Agitation during the addition of the lignin solution-latex mixture likewise plays a role in the properties of vulcanizates made from lignin-GR-S coprecipitates, Figure 10. Tensile strength, tear resistance, and abrasion resistance all increase as the agitation is made more vigorous. Elongation, as in other cases, changes but little.

## Summary

The effect of process variables in the coprecipitation of lignin with GR-S has thus been studied as regards their effects on filterability of the coprecipitate and on the properties of vulcanizates made from the coprecipitates. Rapid filterability and high strength properties are both desired. It is seen, however, that they are to at least some degree opposed.

1. Premixing of the lignin solution and latex prior to coprecipitation reduces filterability, but increases strength.
2. Agitation, while the lignin-latex mixture is being added to acid for coprecipitation, reduces filterability, but increases strengths.
3. Lower quantities of acid used for coprecipitation reduce filterability and little affect strengths.
4. Lower temperatures of heating after coprecipitation reduce filterability, but increases strengths.

A final selection of process conditions would appear to depend on some compromise between the greatest filterability and the highest strength values. If sufficient filter capacity is available, then no strength need be sacrificed; on the other hand, there may be many uses where the greatest strengths are not required, and the process can be adjusted accordingly.

## Acknowledgment

The authors are indebted to West Virginia Pulp & Paper Co. for permission to publish the results of this work which was conducted in its development department. The assistance of C. F. J. Mappus in preparing the numerous charts is particularly acknowledged. Thanks are also due other members of the staff who assisted at times in the tests.

## Dermatosis Preventive Cream

A NEW multi-purpose protective cream, reported a major advance in preventing contact dermatoses, was announced by Dr. L. Mason Lyons, medical director, Wright Aeronautical Corp., at the recent meeting of American Association of Industrial Physicians & Surgeons. Dr. Lyons said over two-thirds of the diseases of industrial origin are dermatoses resulting from two types of causative agents: (1) primary irritants, which tend to take natural oils out of the skin, leaving it susceptible to infection by fungi and bacteria; and (2) sensitizers, which after exposure tend to cause an allergic skin reaction. The function of a protective cream is to form a coating which keeps the primary irritants and sensitizers off the skin.

At the Wright plant Dr. Lyons found prevention of dermatoses depends on four factors: careful plant house-keeping; scrupulous attention to personal hygiene by workers; proper selection and placement of workers sensitive to certain irritants; and plantwide use of effective protective media. Every employee coming in contact with irritants or sensitizers must be instructed to wash exposed parts of the body with a mild soap at least every two hours and then apply an effective protective cream. Dr. Lyons found available industrial creams did not afford satisfactory protection and developed a new ointment of the vanishing-cream type, packaged in tubes for convenient carrying. In 12 months of use not one case of industrial dermatitis developed in those employees who washed every two hours and applied the new cream.

# The T-R (Temperature-Retraction) Test for Characterizing the Low-Temperature Behavior of Elastomeric Compositions

J. F. Svetlik<sup>1</sup> and L. R. Sperberg<sup>2</sup>

IN RECENT years more and more attention has been devoted to the development of elastomeric compounds which possess superior low-temperature properties. When materials for low-temperature applications are being developed, cognizance must be taken both of their tendency to harden and to crystallize upon storage. A material may excel in resistance to freezing, but may be unsuitable because it undergoes crystallization even when stored at a temperature higher than its freezing point.

Various test methods have been devised to measure the low-temperature properties of elastomeric materials. Since the flexibility of rubber compounds decreases at lower temperatures, many investigators have attacked the problem from the standpoint of modulus stiffening<sup>3</sup> by measuring the modulus at several temperatures and determining the rate of hardening. The low-temperature properties of elastomeric materials can also be determined by measuring the change in elasticity at various temperatures.

In 1945 the rubber evaluation laboratory of Phillips Petroleum Co. initiated an investigation of the T-R test as a means of measuring the freeze resistance of elastomeric compounds. The T-R test is based upon the principle of the T-50 test,<sup>4</sup> but differs in that temperatures corresponding to retractions of 0, 1, 2, 3, 5, 10, 20–90% are measured rather than just the temperature corresponding to 50% retraction. Yerzley and Frazer<sup>5</sup> utilized a similar test for neoprene vulcanizates and concluded that the test was inadequate. More recently Smith *et al.*<sup>6</sup> successfully applied the test, using a 250% test elongation.

Development work on the T-R test indicated that the test elongation is an important factor which must be considered in applying the test. This test has been utilized at variable test elongations to measure the freeze resistance and at low elongations to measure the tendency of compounds to crystallize upon cold storage. It has also been found that the tendency of materials to crystallize upon stretching can be determined by making the determinations at varying degrees of elongation.

This report discusses the utility and versatility of the T-R test for studying the low-temperature characteristics of different elastomeric compounds. Although many rubbers have been investigated, the discussion is limited to a study of six different elastomers.

## Procedure

The standard Scott T-50 apparatus and individual Scott T-50 racks are utilized in the determination. The racks are marked to indicate points at which the sample has retracted 0, 1, 2, 3, 5, 10, 20, 30, 40, 50, 60, 70, 80, and 90% of the original elongation. Distances corresponding to the various degrees of retraction are calculated using the following equation:

$$D = \frac{X}{100} (L_e - L_o)$$

where D = distance corresponding to X % retraction

X = any degree of retraction

L<sub>e</sub> = length of elongated specimen

L<sub>o</sub> = length of original specimen

For example, a 4.0-inch specimen elongated 50% to a total length of 6.0 inches must retract 0.40-inch for 20% retraction:

$$\frac{20}{100} (6.0 - 4.0) = 0.40\text{-inch}$$

Tests employing low elongations are performed with a 4.0-inch test specimen; while tests performed in excess of 100% elongation use the 2.0-inch specimen.

The test bath of the T-50 apparatus is filled with acetone or other suitable coolant, and the temperature lowered to -70° C. Specimens are fastened in the racks, elongated, conditioned in water at room temperature for five minutes, dipped into acetone (room temperature), and immediately immersed into the cold acetone bath. After the specimens are conditioned in the cold bath for three minutes, the clamps are released and the temperature is allowed to increase at a rate of 1° C. per minute. Temperatures corresponding to retractions of 0, 1, 2, 3, 5, 10, 20, 30, 40, 50, 60, 70, 80, and 90 per cent are observed and recorded.

When crystallization studies are conducted the elongated test specimens are conditioned for a specified time interval at the desired temperature in a regulated cold box and are then transferred adiabatically to the bath of the T-50 apparatus. The procedure thereafter is identical to that employed for measuring freeze point.

<sup>1</sup> Phillips Petroleum Co., research and development department, research division, Phillips, Tex.

<sup>2</sup> Formerly with Phillips Petroleum; now with J. M. Huber Corp., Borger, Tex.

<sup>3</sup> F. S. Conant, J. W. Liska, *Rubber Chem. Tech.*, 18, 318 (1945).

<sup>4</sup> S. D. Gehman, D. E. Woodford, S. C. Wilkinson, Jr., *Ind. Eng. Chem.*, 39, 1108 (1947).

<sup>5</sup> J. W. Liska, *Ibid.*, 36, 40 (1944).

<sup>6</sup> W. A. Gibbons, R. H. Gerke, H. C. Tingey, *Ind. Eng. Chem. (Anal. Ed.)*, 5, 279 (1933).

<sup>7</sup> *Ind. Eng. Chem.*, 34, 332 (1942).

<sup>8</sup> O. H. Smith, W. A. Hermonat, H. E. Haxo, A. W. Meyer, *Anal. Chem.*, 23, 322 (1951).

## Experimental Details

The rubbers selected for this study were GR-I, Hycar OR-15, polybutadiene (prepared at 122° F.), GR-S, neoprene, and natural rubber compounded according to the formulations in Table 1.

TABLE 1. COMPOUNDING RECIPES

Type-Elastomer	GR-I	Hycar OR-15	GR-S	Neoprene	122° F. Polybutadiene	No. 1 Smoked Sheets
Elastomer	100	100	100	100	100	100
Wyex EPC Black	50	50	50	..	50	50
Stearic acid	3	0.5	..	..	..	2
BRT No. 7	..	..	..	..	..	5
Zinc oxide	5	5	5	5	5	5
Sulfur	2	2	2	..	2	2
Captax	0.5	..	..	..	..	..
Methyl Tuads	1	0.1	..	..	..	..
Altax	..	1.25	..	..	..	..
Lt. calc. magnesia	..	..	..	7	..	..
Santocure	..	..	1.2	..	1.2	0.6

### Determination of Freeze Resistance

To determine the freezing point of a stock the T-R data are plotted as shown in Figure 1. A smooth curve is drawn through the experimentally determined points, and the body portion of the sigmoid curve is extrapolated to zero retraction. This is the extrapolated freezing point. Good agreement is obtained when freezing point values determined in this manner are compared to results obtained by the torsion modulus technique<sup>7</sup> (Table 2). These data show that the T-R test measures the second-order transition temperature of elastomeric compounds.

TABLE 2. COMPARISON OF T-R AND TORSION MODULUS FREEZING POINT VALUES

Rubber	Freezing Point, °C	
	T-R- Method	Torsion Modulus Method
GR-I	-51	-48
Hycar OR-15	-11	-12
GR-S	-46	-45
Neoprene	-35	-39
122° F. Polybutadiene	-70	-79
No. 1 Smoked Sheets	-55	-60

The experimental data presented in Figure 1 were determined at 50% elongation. This degree of extension is preferable for freezing point determinations because the T-R curves are somewhat easier to extrapolate than when a high test elongation is used; it will be shown in a following section, however, that the extrapolated freezing point is not appreciably affected by varying the test elongation.

### Utilization of the T-R Test to Measure Low-Temperature Stiffening

It has been observed that a correlation exists between the retraction data of the T-R test and the degree of stiffening as determined by the torsion modulus test; i.e., the temperatures at which the samples retract 50, 20, 10, and 1% correspond, respectively, to the temperatures at which the torsion modulus has increased to two, five, 10, and 100 times the modulus at room temperature. A correlation is shown in Figure 2, where the torsion modulus  $T_2$ ,  $T_5$ ,  $T_{10}$ , and  $T_{100}$  values are plotted *versus* the temperature-retraction  $T_{50}$ ,  $T_{20}$ ,  $T_{10}$ , and  $T_1$  values, respectively.

In each case the curves are displaced slightly to the left of the theoretical curves (dotted lines) which represent a perfect correlation. The results show that near the freezing point ( $T_{10}$  vs.  $T_{10}$  and  $T_1$  vs.  $T_{100}$ ) the correlation is very good. These data indicate that the degree of stiffening is inversely proportional to the percentage retraction, and on this basis the reciprocal of the retraction can be used as an index of stiffness.

<sup>7</sup> Gehman Torsional Stiffness Test, ASTM D-1053-49 T.

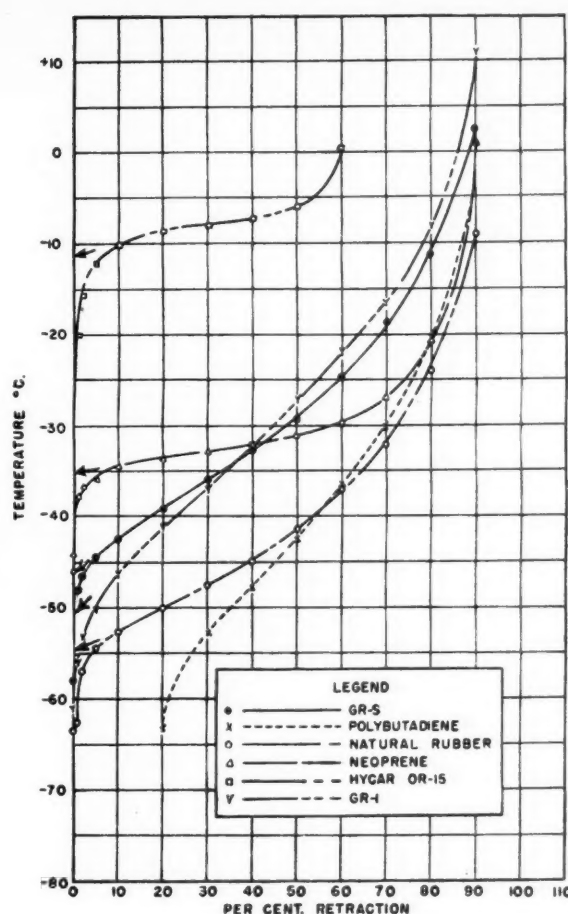


Fig. 1. Typical Temperature-Reaction Curves

### Determination of Crystallization

#### Effect of Elongation on Materials Which Crystallize upon Stretching

During the investigation of the T-R test method it was observed that the contour of T-R curves for different elastomers was affected by varying the test elongation. This point is demonstrated in the T-R curves in Figure 3 for GR-S, GR-I, neoprene, and natural rubber, determined at several elongations. Since the curves for Hycar OR-15 and polybutadiene are similar to those of GR-S, these are not shown. As the test elongation is increased, GR-S retracts at a more rapid rate, which is evident in the greater degree of retraction at equal temperatures. GR-I differs in that the rate of retraction increases when the test elongation is raised from 25 to 200% and then decreases at progressively greater elongations. Natural rubber increases in rate of retraction when the extension is increased from 25 to 50% and then decreases in rate of retraction as the test elongation is increased further. Neoprene is relatively unaffected by varying the extension from 25 to 50%, but further increases in elongation result in progressively lower rates of retraction.

The effect of extension is shown in another manner in Figure 4. In this plot the temperatures corresponding to various degrees of retraction are plotted as a function of the elongation. An examination of the extrapolated  $T_0$  (temperature at 0% retraction) curves for the different rubbers shows that the extrapolated freeze point values are affected only slightly by varying the extension.

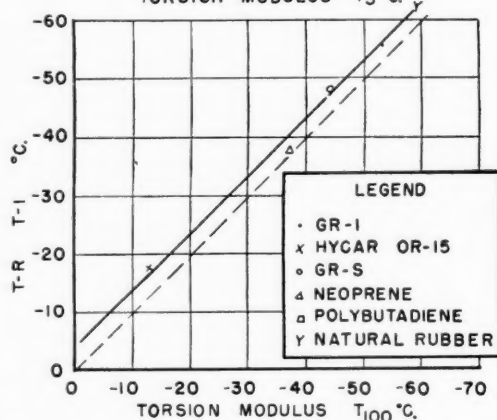
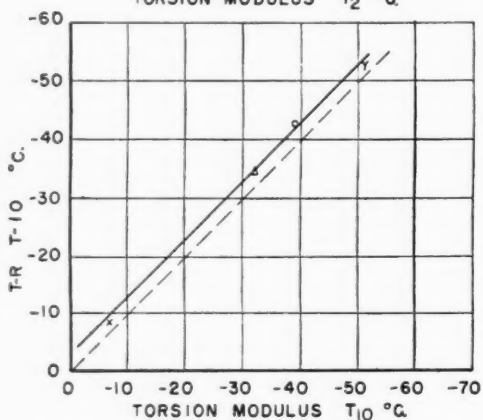
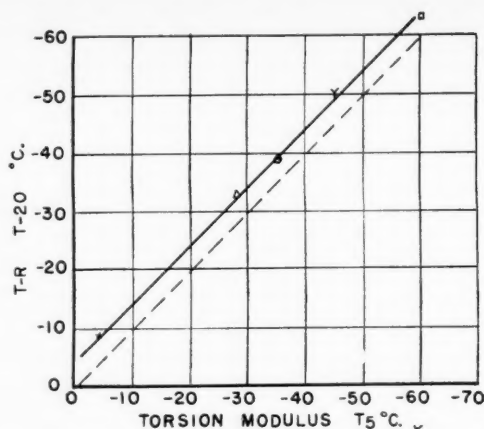
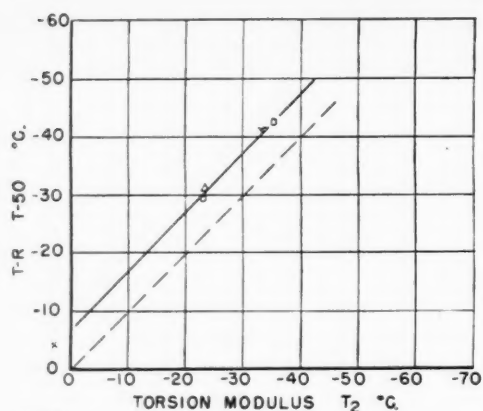


Fig. 2. Comparison of T-R T-50, T-20, T-10, T-1 Valves to Torsion Modulus  $T_2$ ,  $T_5$ ,  $T_{10}$ , and  $T_{100}$  Values

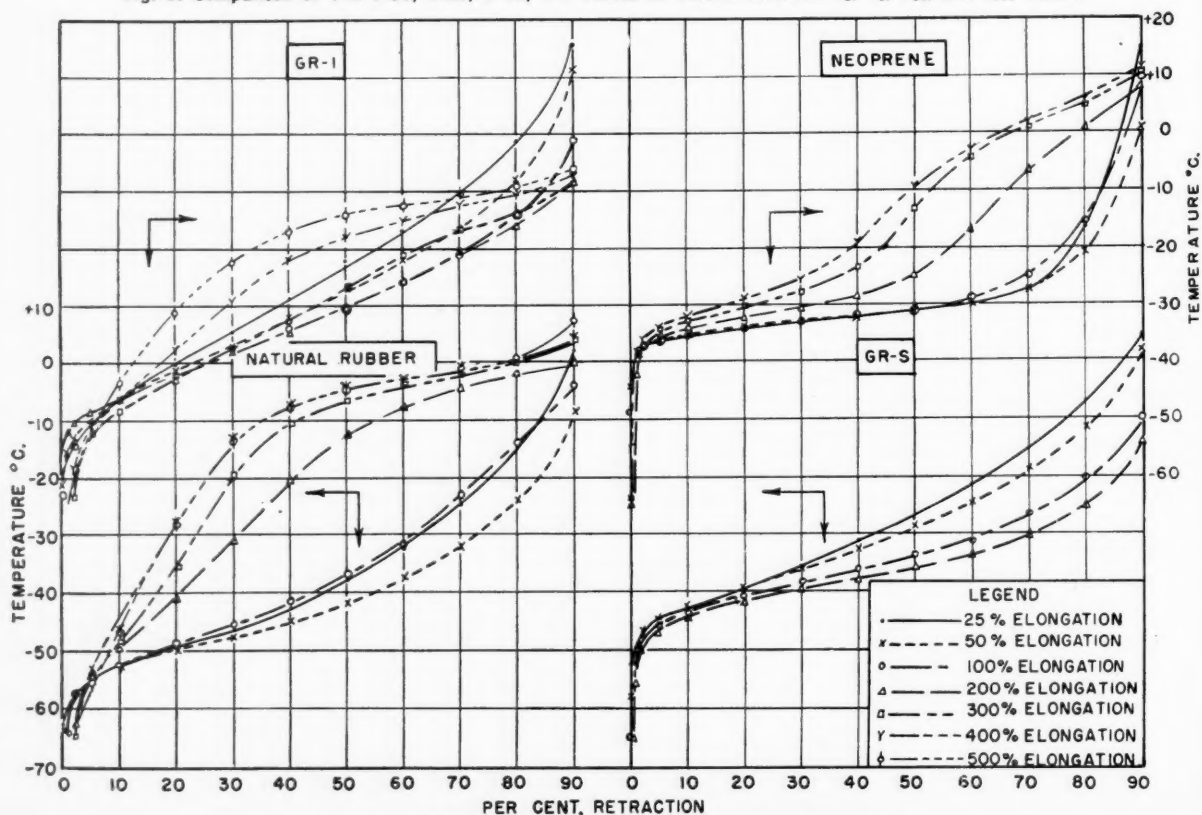


Fig. 3 Effect of Elongation on Temperature-Retracton Characteristics

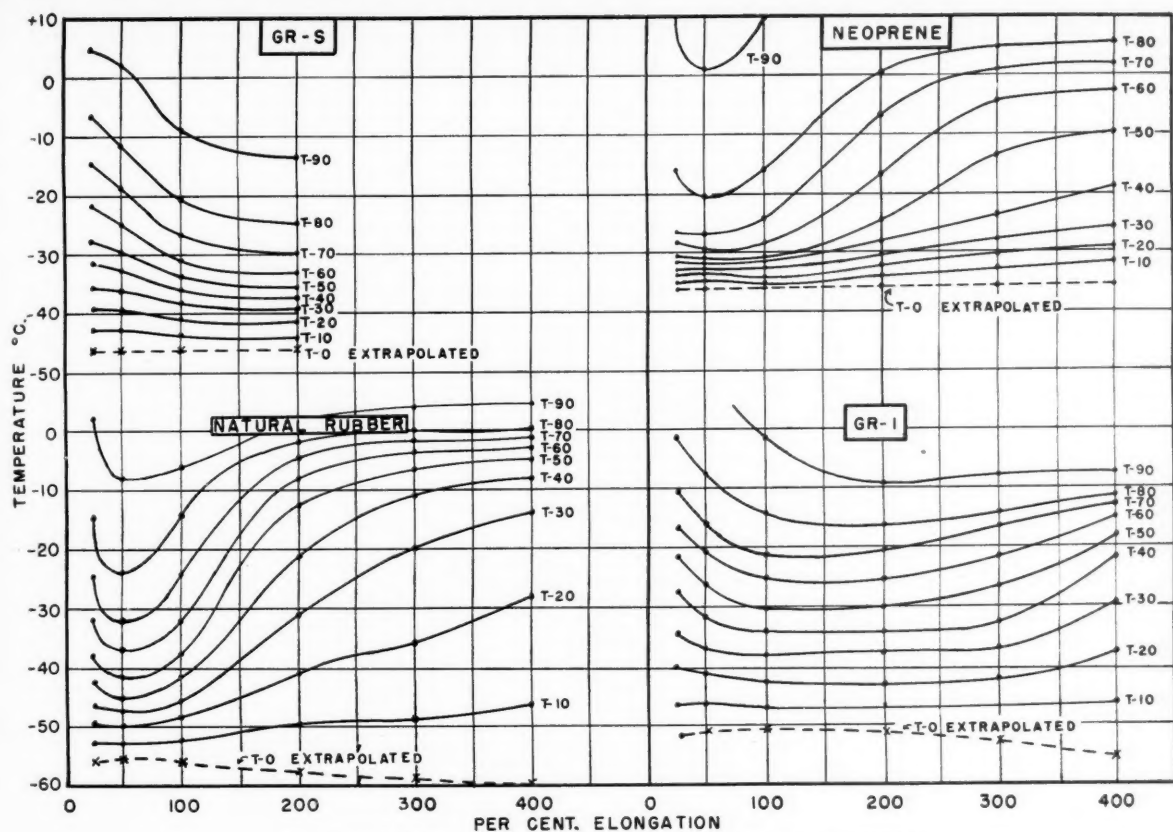


Fig. 4. Variation of Temperature-Retraction T-Values Test Elongated

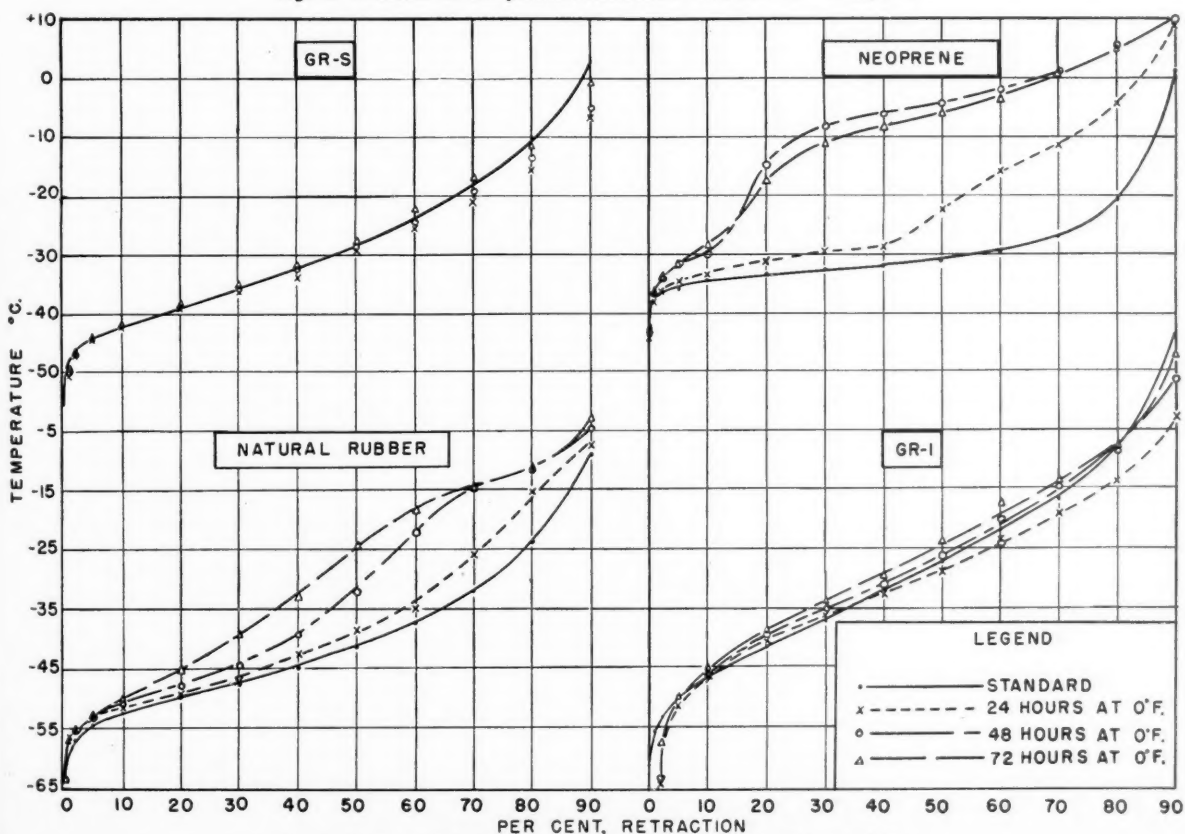


Fig. 5. Effect of Cold Storage on Temperature-Reaction Characteristics

Since it is known from X-ray studies and other means that natural rubber, neoprene, and GR-I crystallize upon stretching, it becomes evident that the more sluggish retraction of these materials at higher elongations is associated with crystallization and that the T-R test can therefore be used to detect tendencies to crystallize upon stretching if the determinations are made at a range of test elongations. Since GR-S does not crystallize upon stretching, no such phenomenon is observed, and the rate of retraction is increased at higher test elongations because the retractive forces are greater.

#### Effect of Low-Temperature Storage

The T-R test can be utilized to detect crystallization which occurs when elastomeric compounds are stored for a prolonged period of time at a low temperature. The results of a crystallization study conducted on specimens which were elongated 50% are presented in Figure 5.

GR-S, which exhibits no tendency to crystallize, is not affected by conditioning up to 72 hours at 0° F. The curves for GR-S are practically superimposed which attests to the reproducibility of the test since determinations were made on different days. Crystallization is apparent in GR-I, neoprene, and natural rubber in the lower rate of retraction of the conditioned specimens. GR-I shows only a small degree of crystallization after conditioning for 48 and 72 hours at 0° F. Neoprene and natural rubber, both of which crystallize more readily, show markedly lower rates of retraction of specimens which had been conditioned at 0° F. prior to testing, and the effect is greatest for the longest conditioning cycles.

Similar data were developed for Hycar OR-15 and 122° F. polybutadiene. These stocks show no tendency to crystallize, and the curves are similar to those of GR-S.

A test elongation of 50% has been found to be optimum to use for crystallization studies. The need of this is apparent when one recalls that some stocks crystallize upon stretching to a high elongation, and any subsequent crystallization due to storage would be small and difficult or impossible to detect.

Cold compression set data were also determined on these stocks. The results (Table 3) show that GR-S and polybutadiene do not crystallize, and that the degree of crystallization of neoprene and natural rubber increases with increased storage time at a low temperature. The Hycar OR-15 stock was completely frozen and consequently showed essentially 100% set. In this respect the cold compression set test is deficient because it is not possible to differentiate between true crystallization and ordinary cold hardening or freezing.

TABLE 3. COLD COMPRESSION SET DATA

Rubber	Conditioning Time at 0° F. and 35% Deflection			
	15 Hours	24 Hours	48 Hours	72 Hours
GR-I	17.8	23.2	22.2	23.9
Hycar OR-15	90.5	97.7	95.0	95.5
GR-S	20.5	22.4	20.1	20.3
Neoprene	18.5	28.1	59.0	80.4
122° F. Polybutadiene	15.9	20.1	20.1	17.8
No. 1 Smoked Sheets	15.3	27.6	30.8	42.6

#### Effect of Polymerization Temperature on Crystallization

Polymerization temperature exerts a significant influence upon the properties of synthetic elastomers, and it has been shown by Beu *et al.*<sup>8</sup> that polybutadiene pre-

<sup>8</sup> K. E. Beu, W. B. Reynolds, C. F. Fryling, H. L. McMurry, *J. Polymer Sci.*, 3, 465 (1948).

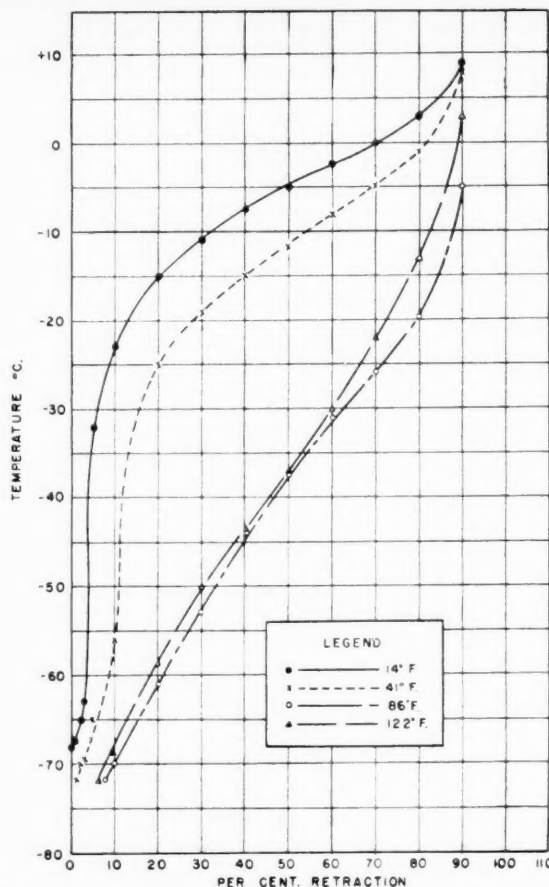


Fig. 6. Effect of Polybutadiene Polymerization Temperature on Temperature-Reaction Characteristics

pared at low temperatures possesses some structural regularity. Since elastomers which exhibit structural regularity are subject to crystallization, it was decided to evaluate the effect of polymerization temperature on the low-temperature properties. For this purpose polybutadiene elastomers prepared at 122, 86, 41, and 14° F. were studied.

The T-R curves for those four elastomers compounded in a conventional tread recipe are presented in Figure 6. Polybutadiene produced at 41 and 14° F. exhibits sluggish retraction characteristics indicating a high degree of crystallization. This trend is most pronounced in the polybutadiene prepared at 14° F. These results are very significant in that they show that crystallization occurs almost immediately upon exposure to the low temperature since none of the samples received any prior conditioning.

The cold compression set results determined on these stocks (72 hours at 0° test cycle) are presented in Table 4, and the results confirm the conclusions which were reached from observing the T-R curves in Figure 6.

TABLE 4. COLD COMPRESSION SET DATA FOR 122, 86, 41 and 14° F. POLYBUTADIENE COMPOUNDS

Polymerization Temperature, °F	% Cold Compression Set
122	23.0
86	26.2
41	78.7
14	92.8

The freezing point of polybutadiene elastomers prepared at 41 and 14° F. cannot be determined accurately from the curves in Figure 6.

## Absorption of Coolant by Test Specimens

Tests conducted in a liquid medium may be open to criticism on the basis that some of the test fluid may be imbibed by the specimens and thereby affect the results. The quantity of acetone absorbed by natural rubber, GR-S, and GR-I after immersion for 10 minutes at five different temperatures has been determined. The results are presented in Table 5.

TABLE 5 QUANTITIES OF ACETONE ABSORBED BY THREE RUBBERS AT VARYING TEMPERATURES

Rubber	Temperature				
	-66° C.	-40° C.	-20° C.	0° C.	+20° C.
	% Acetone Absorbed				
GR-I	0.09	0.16	0.02	0.04	0.03
GR-S	0.14	0.33	0.54	1.33	3.01
Natural rubber	0.21	0.25	0.27	0.48	1.89

Only negligible quantities of acetone were absorbed by the specimens at the low temperatures. It is apparent that the absorption of acetone by the test specimens would affect only the high values of retraction (70, 80, or 90%). The effect of the coolant can therefore be discounted.

## Conclusions

The utility of the T-R test for determining the freezing points of elastomeric compounds and their tendency to crystallize has been demonstrated. The freezing point is not appreciably influenced by test elongation, but from an operational standpoint it is preferable to employ 50% extension of the test sample. To determine the tendency to crystallize upon cold storage a 50% test elongation is optimum. To determine if a stock crystallizes upon stretching the determination must be made at a series of elongations, or a minimum of two test elongations such as 50 and 200-300%. Materials which crystallize almost immediately at low temperature are readily recognized. All materials which crystallize exhibit sluggish retraction characteristics, whether the crystallization is spontaneous, induced by cold storage, or by extension.

The T-R test is simple to perform, highly reproducible, and very versatile. A complete characterization of the low-temperature properties of an elastomeric compound can be made by means of the T-R test in a shorter time than by any other test method or combination of methods.

# Rubber and Plastics Industries Gaining in Australia

## Report on the Rubber Industry

LATE reports from Australia state the local rubber industry consists of 370 establishments, including those engaged in recapping and retreading. The manufacture of pneumatic tires and tubes and accessories for motor vehicles accounts for 75 to 80% of all the rubber consumed here. Mechanical rubber goods use one-third of the remaining 20 to 25%; while a wide variety of miscellaneous rubber goods requires the balance.

Consumption of crude rubber has been rising steadily in recent years, and the commonwealth is said to be using rubber at the rate of roughly 3,000 tons a month at present. The milling capacity of the industry today is put at 60,000 tons of compounded rubber a year, but production is hampered by shortages of labor and of dollar materials, chiefly tire cord and fabric, so that the gap between demand and output is larger than it might otherwise have been and must be filled by imports. The shortages of tires for agricultural purposes is particularly pressing, and the government plans to import such tires from the United States as well as from some soft-currency countries, it is said.

The local rubber industry, already well-established in 1939, received an extra stimulus from the war, and since then there have been further developments. Certain companies plan to increase production of rubber flooring and anti-corrosive pipe linings; the manufacture of sponge and foam rubber and a wide range of articles for the furniture and transport industries are also on the program. Dunlop (Australia), Ltd., is to embark on a considerably expanded program involving not only the production of tires, but also of mechanicals, sporting goods, and plastic products.

It is reported that the government will reimpose price control on a number of articles including automobile tires and tubes and rubber hose.

At a meeting of the Australasian Section of the Institution of the Rubber Industry held in Melbourne, October 25, the Second Foundation Lecture was presented by R. M. F. Fitzpatrick, who was active in launching the section. He spoke on "Rubber in the Past, Present, and Future." Among the guests was G. S. Cook, secretary of the British Rubber Development Board, who was in Australia in connection with the opening of a local office.

A rubber and plastics technical service laboratory has been opened by Imperial Chemical Industries of Australia & New Zealand, Ltd., at Deer Park, Melbourne.

## Report on the Plastics Industry

Much interest in plastic goods is evident in Australia, and a growing demand for raw materials from which to make them is to be expected. Of the current output of garden hose amounting to 20,000,000 feet yearly, 8,000,000 feet are of plastics, and the demand for the plastic article is increasing.

Comparatively recently the manufacture of 1/2-inch and 3/4-inch water piping was begun here; two types are produced, one from cellulose acetate butyrate, imported from the United States, and the other from polythene, bought from the United Kingdom. These goods seem to be finding a favorable market in Australia, and larger suppliers of the basic materials will have to be imported, although the need of dollars for the purchase of the butyrate will limit its use. Up to now, for the same reason, the rapid development of polystyrene articles has been prevented. In view of the active demand for the material, however, it had been contemplated importing polystyrene from Britain, Germany, and Italy, and the possibility of making styrene in Australia from imported styrene monomer was also under consideration.

Monsanto Chemicals (Australia), Ltd., has announced it will erect a plant to manufacture Lustrex polystyrene in Australia. The new plant, the first of its kind here, will cost £A. 250,000 and will be located at Monsanto's Melbourne factory. It is expected ultimately to be able to cover all Australian demands for the material.

Present consumption of thermoplastics is about 1,400 tons a year and increasing.

Polyvinyl chloride and related polymers are now imported from the United States, but these imports are designed to cease before long since a new plant is being built in Sydney which will produce 2,000 tons of polyvinyl resin a year, enough to cover even the increased demand looked for in the near future.

"Sindar Reporter." No. 1, 1951. Sindar Corp., New York 18, N. Y. 4 pages. This issue of the Reporter consists of an article on G-4 (dichlorophene) as a mildewproofing agent for fabrics and other materials. A feature of the article is a table listing all government specifications under which G-4 may be used to meet the mildewproofing requirements.

# Editorials

## The Case against International Allocations and Controls on Rubber

THE first information to come out of the meeting of the International Study Group, held in Rome, Italy, during the week of April 16, and attended by many American industry leaders as advisers to the official State Department delegate, indicates that the meeting was deadlocked on the issue of an international allocation system for rubber.

Agreement on an international allocation system, which has been proposed as a means of stabilizing natural rubber prices and the shipment of rubber from producer to consumer, is reported unlikely for two reasons. Delegates from major natural rubber consuming nations, of which the United States is the biggest, are reported as "unable to assure long-term purchasing agreements to producing countries in return for promises of specified amounts of rubber at fixed prices during the present period of short supply."

The second reason is given as the "reluctance of the United States to offer her synthetic rubber output for a proposed worldwide rubber pool."

INDIA RUBBER WORLD is in complete agreement with the position taken by the United States delegate on both counts and hopes that the present position is maintained. Long-term, fixed-price agreements on natural rubber would appear to be even less desirable now than they were a few months ago.

Jess Larson, administrator of our General Services Administration, since the first of the year exclusive buyer of natural rubber for the United States stockpile and industry, stated in his testimony before the Senate Select Committee on Small Business on April 12 that "we can see the day not too far away when we can report to the American people that our goals (stockpile) have been achieved." Larson, of course, did not elaborate as to just what month the stockpile goal will be reached, but this evidence is the first that it might be sooner than a year or more from now.

It would certainly be foolish for our government to saddle the taxpayers and the industry with a long-term natural rubber buying agreement of several years' duration and presumably at a fairly high price when our withdrawal from the market, as far as stockpiling is concerned, should cause world prices to decline.

There is evidence from testimony before this same Senate committee by industry leaders that a relaxation of the government's accelerated stockpile buying program is immediately necessary if our essential civilian economy is not to suffer serious setbacks in 1951.

The statement by P. W. Litchfield, chairman of The Goodyear Tire & Rubber Co., highlighted the fact that industrial production for the whole country is on the upgrade with an index of about 125 for the second

quarter of this year, while rubber goods production, because of rubber consumption restrictions, is on the downgrade with an index of about 105. Since rubber is an integral part of our economy, the effect of the shortage of rubber products caused by this situation is obvious. If the military situation will permit, the rate of building up the strategic stockpile of natural rubber should be slowed down in the third quarter of 1951, and the extra rubber thus made available to industry.

Further development of the idea that government buying of natural rubber for stockpiling may soon be slowed down or halted brings forth the desirability of the government discontinuing its policy of acting as the exclusive buyer and distributor. It has not lowered the world market price, and except for the stockpile, industry needs in this country can be more satisfactorily taken care of by the individual companies themselves.

For the United States under the present conditions of supply and demand for synthetic rubber in this country to become a party to an agreement requiring the distribution of synthetic rubber to other countries at the will of an international allocation board is also undesirable and impractical. We are having enough trouble right now trying to distribute our supplies of synthetic rubber equitably among domestic consumers without having the added complication of an international allocation system applied to this rubber also. If and when a surplus of synthetic rubber becomes available in this country, export should be through the usual trade channels and not by direction of an international allocation board.

At the risk of being included with those who are being criticized for wanting to do "business as usual" in a time of national emergency, INDIA RUBBER WORLD supports those who recommend that the government:

(1) Declare a moratorium on stockpile buying and reappraise on a realistic basis our stockpile objectives.

(2) While rubber allocations are in force, allow not less than 90,000 tons of rubber a month for essential civilian uses, with the preferable level between 95,000 and 100,000 tons as soon as the stockpile situation and the supply demand situation on synthetic rubber will permit.

(3) Get rid of the allocation system for new rubber as soon as possible.

Let us not have controls just for control's sake! Barring an all-out war, the world supply-demand situation on rubber is going to change from a shortage to a surplus in the course of the current year, and then neither national nor international controls will be necessary.

*R. G. Seaman*

# DEPARTMENT OF PLASTICS TECHNOLOGY

## Polyamide Resin Suspensoids<sup>1</sup>

Harold Wittcoff,<sup>2</sup> D. E. Peerman,<sup>2</sup> F. B. Speyer,<sup>2</sup> and M. M. Renfrew<sup>2</sup>

**A**QUEOUS dispersions of polymers are becoming increasingly important in the coatings and adhesives field where their high solids content, ease of application, and freedom from solvent hazards permit simplification of processing techniques. A new arrival in this field is Polyamide Resin Suspensoid, an aqueous colloidal dispersion of General Mills' Polyamide Resin. This resin is a condensation polymer formed by the reaction of dimerized and trimerized unsaturated acids of vegetable oils with ethylene diamine.<sup>3</sup> The favorable properties of this material have led to a growing usage in heat-seal adhesives where it has been applied both from solutions and as a hot melt.

Polyamide Resin Suspensoid Type A-000 is a colloiddally dispersed counterpart of Polyamide Resin #95, the standard resin to which has been added small concentrations of paraffin, Santicizer 8 (Monsanto), and Staybelite Ester 10 (Hercules). Most of the data reported here is based on work with the Type A-000 suspensoid. Three other types of suspensoids, however, to which compounding ingredients have been added after dispersion, are also available. Suspensoids which are entirely free from plasticizers and other modifiers also have been produced experimentally and may prove superior for certain applications when available in larger quantities.

### Properties of Suspensoids

Basic properties of Type A-000 Polyamide Resin Suspensoid, as well as the three more highly compounded suspensoids, are listed in Table 1. Because of the active experimental program now in progress, modifications in the product specifications are made as often as new developments permit favorable alterations. For example, Type A-000 has been prepared with a solids content of 50%. This material is available for only limited distribution as yet, and the listed value of 35% solids represents the current acceptable level for commercial production.

### Particle Size and Distribution

To determine particle size and distribution the Type A-000 suspensoid was studied both before and after passage through a colloid mill (Charlotte mill set at 0.003-inch at 3,400 rpm.). The samples were studied with a light microscope (magnification of 842-2,100 diameters) and an electron microscope (magnification of 16,000-53,000 diameters). For the light microscope, slides were prepared either by placing one drop of the suspensoid diluted 80 times on a slide, or by adding a small quantity of suspensoid on the tip of a needle to a drop of water on the slide. In both cases the drop was covered and sealed immediately.

For the electron microscope work the sample was diluted 27 times and sprayed from a nebulizer on to a collodion substrate which had previously been stripped from a 15,000-line per inch Baird grating. The grating lines were considered to represent spacings of 1.7 microns.

Microscopic examination indicated that dispersion was excellent in both products; the same results were obtained when samples were allowed to stand quietly, or when they were shaken in a paint shaker. It was readily apparent that the particles fell into two-size groups: those with diameters greater than one micron, and those with smaller diameters. The average size of the larger particles in the un-homogenized sample was 3.0-3.5 microns; whereas in the homogenized sample it was considerably less. In neither sample was there an appreciable number of particles with diameters greater than five microns. The smaller particles in both samples ranged in size from a few hundredths to one-half micron.

An approximate distribution of particle sizes in the homogenized suspensoid is indicated in Table 2.

TABLE 2. PARTICLE SIZE DISTRIBUTION OF HOMOGENIZED SUSPENSOID

% of Particles	Size, Microns
18	Less than 0.5
53	0.5-1.0
29	1-2

From these data it was deduced that the average diameter of particles in the homogenized suspensoid was approximately one micron.

### Viscosity

The viscosity of the homogenized Type A-000 suspensoid of 35% solids content was determined as 0.3-0.4 poise at 25° C. by means of a MacMichael viscosimeter with a No. 26 or 30 wire. The corresponding value for the unhomogenized suspensoid, which required a No. 26 wire, was 2.5 poises; the higher value arose from the larger particle size. These viscosities did not change appreciably upon extensive aging. The variation of viscosity with changes in temperature and solids content are shown in Figures 1 and 2.

### Surface Tension

The surface tension of Type A-000 suspensoid of 35% solids content, as determined with a duNuoy tensiometer, is 40.8 dynes per centimeter at 25° C. The variation in surface tension with changes in temperature is shown in Figure 3. The effect of various anionic surface active agents on the surface tension of the suspensoid is shown in Table 3.

TABLE 3. EFFECT OF ANIONIC SURFACE ACTIVE AGENTS ON SURFACE TENSION OF TYPE A-000 SUSPENSOID

Concen- Agent, %	Surface Tension of at 25° C., Dynes /Cc.
Control	40.8
Octadecyltrimethyl ammonium chloride	47.1
Dodecyltrimethyl ammonium chloride	45.2
Dodecylamine hydrochloride	40.3
Lauryl pyridinium chloride	39.4
Acetate of dodecylaminopropionic acid	39.2
Dodecylamine acetate	41.7
Dodecylamine acetate	41.3
Dodecylamine acetate	40.4
Dodecylamine acetate	37.6

\*Based on total suspensoid.

### Particle Charge

Polyamide Resin Suspensoid is cationic, possessing an acid number of 3-5 and a pH of 4.0-5.5. As such, it is compatible, as will be seen later, with other acidic or neutral emulsions and suspensoids.

<sup>1</sup> Presented before Division of Paint, Varnish & Plastics Chemistry, American Chemical Society, Chicago, Ill., Sept. 7, 1950.

<sup>2</sup> Research department, General Mills, Inc., 2010 E. Hennepin Ave., Minneapolis 13, Minn.  
<sup>3</sup> R. H. Anderson, D. H. Wheeler, *J. Am. Chem. Soc.*, 70, 760 (1948).  
J. C. Cowan, A. J. Lewis, L. B. Falkenburg, *Oil & Soap*, 21, 101, (1944).  
J. C. Cowan, A. W. Schwab, L. B. Falkenburg, *Modern Packaging*, 17, 9, 113 (1944).

TABLE 1. SPECIFICATIONS FOR POLYAMIDE RESIN SUSPENSIDS

	Suspensoid Type			
	A-000	B-200	E-200	B-1001X
Minimum solids content, %	35	37	39	42
Viscosity at 25° C., poises	0.3-0.4	0.5-1.3	5.0-7.0	12.0-15.0
Density at 25° C., gms./cc.	1.006	1.009	1.015	1.013
Average particle size, microns	1.0	1.0	1.0	1.0
pH	4.0-5.5	4.0-5.5	4.0-5.5	4.0-5.5
Acid number	3-5	3-5	3-5	5-12
Particle charge	Cationic	Cationic	Cationic	Cationic
Odor	None	Slight aromatic	None	Slight aromatic
Appearance	Opaque white	Opaque white	Opaque white	Opaque white
Settling rate	Negligible	Very slow	Negligible	Very slow
Mechanical stability	Excellent	Good	Excellent	Excellent

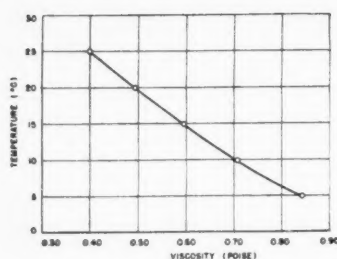


Fig. 1. Effect of Temperature on Viscosity of Polyamide Resin Suspensoid (34% Solids Content)

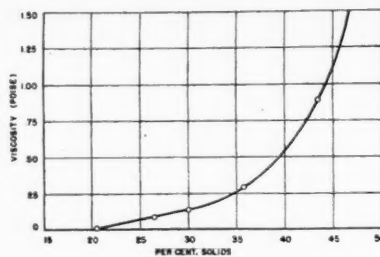


Fig. 2. Effect of Solids Content on Viscosity of Polyamide Resin Suspensoid at 25°C.

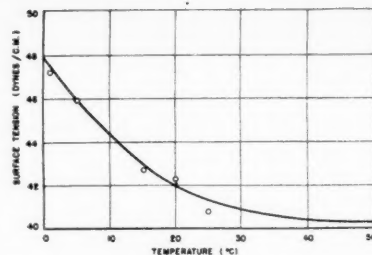


Fig. 3. Effect of Temperature on Surface Tension of Polyamide Resin Suspensoid (35% Solids Content)

Relatively stable suspensoids of opposite charge may be obtained by the rapid addition of five- to ten-fold excesses (based on acidity) of anionic emulsifiers dissolved in small amounts of water. Among those which have been used successfully for this purpose are Duponol C (du Pont) and Nacconol NRSF (National Aniline). Suspensoids which have been subjected to this charge reversal are compatible with a wide variety of natural and synthetic anionic latices and soap stabilized emulsions.

#### Stability

Type A-000 suspensoid demonstrates excellent stability since it is not affected by repeated freezing and thawing, continued heating, or vigorous stirring for long periods of time. It cannot resist continued centrifugation, however, and a stability test has been devised based on this observation.

For stability determination duplicate 100-gram samples of the suspensoid are centrifuged at 2,000 rpm. for 30 minutes at room temperature. The supernatant liquid is decanted as thoroughly as possible, and the residue then weighed. To correct for the quantity of suspensoid adhering to the walls of the centrifuge bottle, blanks are subjected to the above procedure except that centrifugation is omitted. After the blank is subtracted the results should check within one gram. This value is termed the sedimentation factor, and typical results are given in Table 4. The test is of value not only as a control, but also as a means of comparison with other resin emulsions.

TABLE 4. SEDIMENTATION FACTORS OF SUSPENSIDS

Suspensoid	History	Sedimentation Factor, Gms.
Type A-000	Not homogenized	3.2, 3.6
Type A-000	Homogenized	0.2, 0.6
Type A-000	Homogenized and aged six months	1.3, 1.6
Type A-000 (48% solids)	Homogenized	1.6, 1.6
Type E-200	Homogenized	0.0, 0.0
Type B-1001X	Homogenized	0.0, 0.0

The dilution stability of the suspension was also good, since settling did not occur within a period of 48 hours in samples diluted with tap water to a solids content of 5%. Further dilution to a solids content of 1% caused phase separation within five minutes.

The suspensoid may also be subjected to considerable dilution with ethyl and isopropyl ethers, as well as with water soluble solvents such as methyl, ethyl, and isopropyl alcohols, ethylene glycol, and glycerol. Most water insoluble solvents may be added to the suspensoid by the simple expedient of adding the warm solvent with vigorous stirring to the suspensoid maintained at 70° C. Solvents

which may be added by this procedure include benzene, toluene, xylene, mineral spirits, turpentine, mineral oil, VMP naphtha, Skellysol A and E, butanol, methyl isobutyl carbinol, acetone, methyl ethyl ketone, diacetone alcohol, ethyl acetate, butyl acetate, cellosolve, carbitol, chloroform, ethylene dichloride, and nitropropane.

#### Properties of Films

Supported films may be made from Polyamide Resin Suspensoid by casting, brushing, or flowing. These dull, opaque films are composed of minute, discrete particles that are indistinguishable to the eye. Continuous films are obtained either by fusion, incorporation of plasticizers such as Santicizer 8 or tributyl phosphate, or by incorporation of certain solvents. These solvents must be solvents for the resin and include such materials as xylene, butanol-xylene, chloroform, and methyl isobutyl carbinol. Films of the unmodified suspensoid demonstrate a tendency to "dust," but this may be readily overcome by fusion or by the addition of small quantities of ethyl or isopropyl alcohol, 1% (on a solids basis) of polyvinyl acetate emulsion, 1% of a cationic rubber latex, or 1% polyvinyl alcohol.

Blocking<sup>4</sup> tests were carried out according to TAPPI Standard T-477-m-47 on resin films coated on label paper to a weight of four pounds per ream. The most drastic conditions of temperature, humidity, pressure, and time which the films could withstand are indicated in Table 5.

TABLE 5. BLOCKING PROPERTIES OF SUSPENSOID FILMS (FACE TO BACK)

Suspensoid Film Type	Relative Humidity, %	Pressure, PSI.	Time, Hrs.
A-000	75	1	24
B-200	75	1	24
E-200	100	3	24
B-1001X	75	1	24

All at temperature of 60° C.

Despite the high temperatures at which the films do not block, these same films heat seal at relatively low temperatures. Heat sealing ranges for the various suspensoid films are shown in Table 6.

TABLE 6. HEAT SEALING RANGES OF SUSPENSOID FILMS

Suspensoid Film	Heat Sealing Range, °C.
Type A-000	90-100
Type B-200	70-120
Type E-200	90-170†
Type B-1001X	70-150†

It will be observed that the rather narrow heat sealing range of the Type A-000 suspensoid film has been extended by the

other composition. The temperatures listed are those at which a three-inch strip seal made between two pieces of label paper will support a weight of 35 grams.

Suspensoid films dry rapidly. At 44% relative humidity and 27° C. temperature the films coated at four pounds per ream were "dry to touch" 30 seconds after casting. The actual time necessary for the films from the various compositions to reach constant weight is shown in Table 7. The bulk of the water in each case was lost within 6-10 minutes. By way of comparison, a similar film cast from solvent (1:1 butanol-toluene) dried in eight minutes.

TABLE 7. DRYING TIMES FOR SUSPENSOID FILMS

Type of Film	Time to Reach Constant Weight, Min.
A-000	19
B-200	12
E-200	14
B-1001X	12

Films fused by application of heat demonstrate both water vapor resistance and greaseproofness. Moisture vapor transmission tests were carried out according to TAPPI Standard T-448-m-40 with a relative humidity change of 65-0% at 72° F. Results are shown in Table 8.

TABLE 8. MOISTURE VAPOR TRANSMISSION OF FUSED SUSPENSOID FILM (On 23-Pound Cereal Glassine)

Coating	Weight of Ream, Lbs.	Flat or Fold	Moisture Vapor Permeability, Gms./M <sup>2</sup> /24 Hrs.
None	8-9	Flat	181
Type A-000	8-9	Flat	2.5
Type A-000	10-11	Fold	6.2

Grease permeability was determined by the turpentine penetration test described in TAPPI Standard T-454-m-44. Results of this test appear in Table 9.

TABLE 9. GREASE PERMEABILITY OF FUSED SUSPENSOID FILM (On 23-Pound Cereal Glassine)

Coating	Weight of Ream, Lbs.	Flat or Fold	Penetration Time, Sec.
None	8-9	Flat	2.0, 2.0
Type A-000	8-9	Flat	1,800+
Type A-000	8-9	Fold	1,401

#### Compatibility of Suspensoids

Polyamide Resin Suspensoid is compatible with a great many modifiers which are immiscible with the solid resin itself. Thus the suspensoid is compatible with water soluble and water dispersible substances, such as polyvinyl alcohols, polyethylene glycols, methyl cellulose, dextrans, carboxymethyl cellulose, and other

<sup>4</sup> Adhesion between touching layers of a material, such as occurs under moderate pressures during storage or use.

carbohydrate derivatives. These substances may be added either directly to the suspensoid with stirring, or incorporated into the water used in the suspensoid.

It has been observed that up to 5% of low-viscosity polyvinyl alcohol may be added without increasing the sealing temperature of the suspensoid film or affecting its sealing properties. Addition of low-viscosity polyvinyl alcohol provides a high degree of blocking resistance even under very severe conditions, as shown in Table 10.

TABLE 10. BLOCKING PROPERTIES OF SUSPENSOID FILM CONTAINING POLYVINYL ALCOHOL

% Polyvinyl Alcohol in Type A-000 Suspensoid	% Blocking,* Face to Face	% Blocking,* Face to Back
0	50	0
1	50	0
5	0	0
10	0	0

\*100% relative humidity at 50° C., one psi. pressure for 24 hrs.

Many liquid plasticizers, such as dibutyl phthalate, Santicizer 8, dioctyl phthalate, tricresyl phosphate, tributyl phosphate, dibutyl sebacate, and Flexols 3GH and 3CF (Carbide & Carbon), may be added directly to the suspensoid with vigorous stirring. Solid plasticizers, resins, and modifiers such as rosin esters may be added as solutions. Toluene and mixtures of toluene and butanol are suitable solvents for these modifiers, and the addition of solution to the suspensoid must be accompanied by vigorous stirring.

The suspensoids are compatible with most commercial polyvinyl acetate emulsions, such as Elvacet 81-900 (du Pont). As little as 10% of these emulsions on a solids content basis imparts to the suspensoid the ability to provide seals stable at temperatures of -29° C. and below. As previously indicated, these emulsions also improve the adhesion of the suspensoid particles to paper and other surfaces so that a better film results. In turn, the suspensoid acts as a non-migrating plasticizer for the polyvinyl acetate, improves the water resistance and low temperature stability of the plastic, and makes it less susceptible to blocking. In proper concentration the suspensoid also lowers the heat-sealing temperature of the polyvinyl acetate.

The tensile strengths of the heat seals made from such suspensoid-polyvinyl acetate compositions, as well as the blocking characteristics of the films, are listed in Table 11. The tensile strengths of the seals made with label paper were measured on a Thwing-Albert tester which pulled the seals at a rate of eight feet per minute. All the compositions were coated for testing at a weight of four pounds per ream.

Mixtures of suspensoid and polyvinyl acetate emulsion may be further plasticized with monomeric plasticizers, such as dibutyl phthalate, without appreciably tackifying the film, as is the case when the suspensoid is not present. Blocking data of this nature appear in Table 12.

Polyamide Resin Suspensoid is compatible with cationically stabilized synthetic rubber latices and latex emulsions, including Neoprene Latex RCD-1097 (du Pont), Hycar Latex OR-25 (Goodrich Chemical), and butadiene-styrene latex. Samples of the latter type of latex were prepared with styrene contents varying from 25-75%. All of these latices were compatible with the suspensoid. The suspensoid serves to plasticize these latices, make their films less tacky, and lower

TABLE 11. SEALING AND BLOCKING PROPERTIES OF POLYAMIDE RESIN SUSPENSOID-POLYVINYL ACETATE MIXTURES

Commercial Polyvinyl Acetate Emulsion Used	% Solids in Mixture	% of Solids		Tensile Strength PSI, of Seal Made		Blocking*	
		Polyamide Resin	Polyvinyl Acetate	At 90° C.	At 115° C.	Face to Face	Face to Back
A	50	17	83	0.5	0.7	Yes	Slight
B	50	17	83	1.8	1.1	Slight	No
A	40	50	50	0.6	1.3	No	No
B	40	50	50	0.8	1.3	Slight	No
C	40	50	50	0.7	1.4	No	No
D	40	50	50	0.7	1.8	No	No
A	37	83	17	0.9	1.1	No	No
B	37	83	17	1.2	2.5	No	No
C	37	83	17	0.4	0.5	No	No
D	37	83	17	0.5	1.4	No	No
E	37	83	17	1.5	1.3	No	No

\*75% relative humidity at 50° C., at one psi. pressure for 24 hrs.

TABLE 12. BLOCKING OF POLYAMIDE RESIN SUSPENSOID-POLYVINYL ACETATE EMULSION MIXTURES CONTAINING DIBUTYL PHTHALATE

Commercial Polyvinyl Acetate Emulsion Used	Polyamide Resin Suspensoid, %	Dibutyl Phthalate, %	Blocking*	
			Face to Face	Face to Back
F	15	8	Slight	No
G	15	8	Slight	No
B	15	8	Very slight	No
H	15	8	Yes	No
I	15	8	Yes	No

\*75% relative humidity at 45° C., at one psi. pressure for 24 hrs.

their very high sealing temperatures. These latices are similar in action to the polyvinyl acetate emulsions in that they markedly improve the behavior of suspensoid seals at low temperatures.

As previously indicated, anionic latices and dispersions, such as Dow Latex 512K, are compatible with suspensoids whose charge has been reversed by the addition of anionic surface active agents. It is obvious, therefore, that suspensoids are susceptible to a variety of compounding techniques, all of which contribute to the utility of these materials.

## Applications

General Mills' Polyamide Resin enjoys application in the fields of paper converting and packaging where it is used as a heat seal coating which imparts resistance to grease, oil, water, and water vapor transmission to paper and plastic films. The coating is also used as a laminant and a gloss overcoat. The resin has also found limited use as a leather impregnant, a corrosion resistant protective coating, as a molding and blending resin, and as an ink constituent. Its use as a decorative coating and as a dirt- and water-proofing agent for textiles has also been suggested.

Polyamide Resin Suspensoid offers certain definite advantages over the resin form in applications where films must be spread. The suspensoid does not require the elaborate apparatus necessary for hot melt coating, nor does it present the explosion and toxicity hazards inherent in solvent coating. Furthermore, only water is lost in drying instead of expensive solvents.

The suspensoid has demonstrated applicability in the uses for the resin form mentioned above, especially in the field of paper converting where it provides a non-blocking coating which can be sealed to cellulosic materials, coated cellophanes, wood, cloth, glass, metal, and metal foil. It can also be used as a laminant for these materials.

The suspensoid acts to expand further the present horizon for polyamide resins because its increased compatibility with numerous additives such as latices, other polymer emulsions, and water soluble substances greatly increases the opportunities for compounding. In addition to the previously discussed advantages as an addi-

tive and plasticizer for latices and polyvinyl acetate emulsions, the suspensoid offers promise as a component of "wet stick" adhesive formulations and, either alone or in combination with latices, may serve as a base for protective and decorative coatings because it can be pigmented.

The suspensoid has also been found to serve as a binder for sawdust, cork, and other such particulate matter. The suspensoid may be added to pulp during the fabrication of paper in order to enhance the water vapor and grease resistance of the product and impart other desirable properties. The suspensoid may also be useful in the leather industry as a pigment binder and in the textile industry as a waterproofing and soil resisting agent.

## Acknowledgments

The authors gratefully acknowledge the technical assistance of Mrs. Carolyn B. Brown, and the cooperation of Richard I. Derby who carried out the microscopic studies on particle size and distribution. Thanks are also due to Harold Boyd and Mrs. Olive W. Schmidt for surface tension and other analytical data.

## Discuss Military Research

A TALK on military research and development, entitled "Proof of the Pudding," by Col. Benjamin S. Mesick, Army Ordnance Corps, featured the March 22 meeting of the Thiokol Technical Club, held at Thiokol Corp., Trenton, N. J. Some 140 members and guests of the group attended the meeting, which included a social hour and dinner.

Colonel Mesick reviewed the history of military research and development and pointed out that while the primary object of such work was to keep the country prepared, many contributions have been made toward the progress of metallurgy, chemistry, physics, textiles, rubber, and medicine. The speaker cited many examples of such contributions made by the military and described the Army's organization for handling research and development. At the conclusion of his talk, Colonel Mesick showed a motion picture film illustrating the progress made by military research during recent years.

## Reports from SPE Sections

A TALK on "Handling Plastics Problems in the Ordnance Corps" featured the April 18 dinner-meeting of the New York Section, Society of Plastics Engineers, held at the Hotel Shelburne, New York, N. Y., with 65 members and guests attending. The scheduled speaker, Lucius Gilman, Picatinny Arsenal, was unable to attend because of illness, and the paper was given by William Powers, also of the Arsenal.

After reviewing the scope of products handled by the Army Ordnance Corps, Mr. Powers noted that the use of plastics in these items is increasing at a steady rate. Ordnance research and development work on plastics is handled at the plastics laboratory at Picatinny. The speaker described the organization of the laboratory, its facilities, and its work in testing plastics to determine their suitability in ordnance equipment. A spirited discussion followed the talk as the speaker answered questions from the floor regarding engineering and procurement problems encountered by the plastics industry under ordnance contracts.

Table favors were distributed through the courtesy of Dusal Tool & Mold Co., and the meeting closed with a drawing for door prizes contributed by Brillhart Plastics Corp., Celanese Corp. of America, and Wess Plastic Molds, Inc.

### Hear Connelly and Akin

Approximately 80 members and guests of the Newark Section attended the regular dinner-meeting on April 11 at the Military Park Hotel, Newark, N. J. Featured speaker was Lewis B. Connelly, Tennessee Eastman Division, Eastman Kodak Co., who discussed "Use of Tenite to Combat Corrosion in the Oil Country." The talk was similar to that given by Mr. Connelly before the January 10 meeting of the Chicago Section, and reported in our February issue, page 574.

Russell B. Akin, E. I. du Pont de Nemours & Co., Inc., showed a short film on the subject of ASTM tests on plastics and gave a discussion of the relative values of these tests.

The meeting closed with a drawing for a door prize contributed by Gemloid Corp. and won by Albert A. Kaufman, Industrial Synthetics Corp.

### New Injection Molding Tools

Approximately 45 members and guests of the Miami Valley Section attended a regular dinner-meeting on April 6 at Eaton Manor, Hamilton, O. Speaker of the evening was A. R. Morse, Injection Molders Supply Co., who discussed "New Production Tools for the Injection Molder." Mr. Morse's talk, similar to those recently given before other SPE sections, covered such topics of silicone lubricants, use of surger materials, use of liquid stearates as lubricants, and dry coloring practices. Jesse H. Day, editor of *SPE Journal*, was a surprise visitor at the meeting and spoke briefly on the 1951 SPE Prize Paper Contest, urging all members to enter it.

### Adhesives and Coatings

The Upper Midwest Section held a regular dinner-meeting on March 12 at Esslinger's Cafe and heard Gordon Hollingsworth, Minnesota Mining & Mfg. Co., speak on "Adhesives in New Product Development." The talk dealt with new developments in the field of adhesives and

coatings, and the speaker said that there are now no limitations on what can be bonded to what. The bonding of rubber to metal, metal to wood, and metal to metal were discussed in detail, and it was emphasized that adhesive bonding can often be many times stronger and less costly than conventional mechanical fasteners.

### Vacuum Metallizing

A talk on "Metallizing by High Vacuum," by Tom C. Comer, Distillation Products Industries, division of Eastman Kodak Co., highlighted the March 14 joint meeting of the Chicago Section, SPE, and Midwest Chapter, SPI. Approximately 100 members and guests attended the meeting, which was held at the Builder's Club, Chicago, Ill., and included a cocktail hour and dinner.

Mr. Comer described in detail the high vacuum metal evaporation technique to produce metal coatings on plastics in order to increase the attractiveness of the

product, yet reduce cost by permitting the use of cheaper plastic compositions. The process, in commercial use for about 1½ years, has the advantages over other metallizing methods of lower unit cost and the fact that the brightness of the finish is unaffected by aging.

Surfaces to be coated are arranged in a vacuum chamber to face the point from which the heated metal is evaporated. The vaporized metal molecules travel in straight lines from the source to attach themselves firmly to the surface being coated. Objects may be rotated to permit all sides to be coated, and winding mechanisms can be used for continuous coating of sheet material.

Since the metal coating will reflect the characteristics of the surface being covered, it is sometimes necessary to employ fill-in coats of lacquer to obtain high gloss, Mr. Comer said. The metallic coating is 0.00005-0.001 inch thick, and a protective lacquer is applied where subsequent physical handling of the material might damage the metallic surface. In addition to the metallizing equipment, the speaker also discussed auxiliary equipment such as baking ovens, dipping racks, loading jigs, rotating jigs, and degassing equipment for continuous rolls.

A talk on "Employee Relations in an Arsenal Economy," by Benjamin Werne, special labor counselor to the SPI, highlighted the April 11 joint dinner-meeting of the Chicago Section and the Midwest Chapter. Some 70 members and guests attended the meeting, also at the Builder's Club, and heard Dr. Werne describe the difficulties to be expected in employee relations during a period when the nation's production is geared to an all-out defense effort. Some of the methods which lead to a better understanding of the problem by both labor and management were also discussed.

## CALENDAR

- |           |   |
|-----------|---|
| May 16.   | New York Section, SPE, Hotel Shelburne, New York, N. Y.   |
| May 18.   | Buffalo Rubber Group and Ontario Rubber Section, International Meeting, General Brock Hotel, Niagara Falls, Ont., Canada. |
| May 22.   | Washington Rubber Group.  |
| May 24.   | Society of the Plastics Industry.   |
| 25.       | Greenbrier Hotel, White Sulphur Springs, W. Va.   |
|           | Canadian High Polymer Forum, Royal Military College, Kingston, Ont., Canada.  |
| June 3.   | National Association of Purchasing Agents, Waldorf-Astoria Hotel, New York, N. Y.   |
| June 5.   | The Los Angeles Rubber Group, Inc., Hotel Mayfair, Los Angeles, Calif.  |
| June 14.  | New York Rubber Group, Annual Outing, Doerr's Grove, Millburn, N. J.  |
|           | Rubber & Plastics Division, ASME, Royal York Hotel, Toronto, Ont., Canada.  |
| June 15.  | Akron Rubber Group, Firestone Country Club.   |
|           | Boston Rubber Group, Rubber Chemistry Division, C.I.C. Walper House Hotel, Kitchener, Ont., Canada.                       |
| June 17.  | Japanese Trade Fair, Seattle, Wash.   |
| June 18.  | American Society for Testing Materials, Annual Meeting, Atlantic City, N. J.  |
| June 23.  | Southern Ohio Rubber Group, Outing.   |
| July 20.  | Buffalo Rubber Group, Outing.   |
| July 26.  | Chicago Rubber Group, Golf Outing, Medinah Country Club, Medinah, Ill.  |
| Aug. 7.   | New York Rubber Group, Golf Tournament, Baltusrol Golf Club, Springfield, N. J.   |
| Aug. 24.  | Philadelphia Rubber Group, Annual Outing, Cedarbrook Country Club, Philadelphia, Pa.                                      |
| Sept. 2.  | American Chemical Society, New York, N. Y.  |
| Sept. 5.  | Division of Rubber Chemistry, A. C. S. Hotel Commodore, New York, N. Y.   |
| Sept. 20. | Southern Ohio Rubber Group, Engineer's Club, Dayton, O.   |

## Plastics in Short Supply

MANUFACTURERS who plan to use plastics as substitutes for scarce metals had better look twice if they do not want to be disappointed, warns Frank H. Carman, assistant secretary in charge of plastics, Manufacturing Chemists' Association. Speaking before the annual meeting of the Commercial Chemical Development Association in New York, N. Y., on March 21, Mr. Carman explained that many types of plastics are in shorter supply than steel or aluminum despite tremendous increases in production since the war.

Civilian requirements for plastics are now far greater than ever before, and this development has created problems with respect to further expansion of the industry. The quantities in which the plastics industry must now think and plan have reached such magnitude that any blueprints for expansion must go all the way back to the basic raw materials, Mr. Carman pointed out. Plastics are now a major claimant for basic chemicals and must compete with other essential end-uses for the available supply. In cases where plastic may be under consideration as a substitute material, its use will depend entirely on the essentiality of the end-product. In the long run it is quite possible that aluminum or steel will be made available unless some particular property of the plastic justifies diversion of chemicals to permit its production.

# Scientific and Technical Activities

## ASTM Committee D-11 Cincinnati Spring Meeting

**M**OST of the subcommittees of Committee D-11 of the American Society for Testing Materials met at Cincinnati, O., on March 7, 8, and 9, and the meeting of D-11 was held on the afternoon of March 9. Subcommittee XII on Crude Natural Rubber met in Washington, D. C., on February 27.

Simon Collier, Johns-Manville Corp., chairman of D-11, was present at some of the subcommittee meetings, but could not remain for the D-11 meeting. H. G. Bimmerman, E. I. du Pont de Nemours & Co., Inc., vice chairman of D-11, presided at the meeting of the full committee, together with Arthur W. Carpenter, B. F. Goodrich Co., secretary.

### D-11 Meeting

The first matter of business at the meeting of Committee D-11 was a report by L. V. Cooper, Firestone Tire & Rubber Co., on the meeting of the International Organization for Standardization—Technical Committee 45 on Rubber, which was held in Akron, O., October 16-20, 1950. ASTM Committee D-11 was host for the overseas delegates for this international meeting, and Mr. Cooper reported that contributions from D-11 members and companies had been ample to cover all expenses and to leave a small surplus.

Mr. Carpenter then reported on the next ISO meeting, scheduled to be held in England in October, 1951. J. R. Scott, Research Association of British Rubber Manufacturers, has written asking for the best attendance possible from the United States at this meeting. A special feature of the program will be a symposium on "Modern Rubber Testing," with emphasis on recent new developments, which will be sponsored by the Institution of the Rubber Industry and held in London, September 28, preceding the ISO meeting in Oxford, October 1 through 5.

Mr. Scott stated that papers by American technologists would be welcome for the IRI symposium and requested that he be informed as soon as possible of those from the United States who were planning to attend the ISO meeting.

Mr. Carpenter also read a letter from the American Standards Association on the work to be carried out in the United States as part of the ISO-Technical Committee 45, Rubber, program.

The ISO committee has asked that work on ozone aging and the cold resistance of rubber vulcanizates be headed by American ASTM members, and a motion was made and passed instructing the secretary of D-11 to inform the ISO committee that D-11 members would be chosen for such assignments.

Mr. Carpenter reported that the D-11 letter ballot on several items sent to the members in advance of the Cincinnati meeting had resulted in 106 votes and that the action recommended on all matters had been approved. Negative votes had been recorded for two items. Two negative votes were made in connection with the new tentative Method of Test for Compressibility and Recovery of Gasket Materials. One of these was not explained; the other was discussed and withdrawn.

Seven negative votes were recorded in connection with the revised tables in D735-48T, Specifications for Automotive Rubber Compounds, and it was requested that approval of these new specifications be delayed in view of the new problems presented by the latest M-2 Rubber Order of the National Production Authority. The negative votes were referred to the joint SAE-ASTM Technical Committee on Automotive Rubber.

J. J. Allen, Firestone, speaking for the subsection of Technical Committee A on revision of tables, reported that the Society of Automotive Engineers had balloted favorably on the revised tables before the latest NPA M-2 Order was announced, but following this announcement some automotive products manufacturers had taken the position that they could not meet the elongation specifications on 100% GR-S compounds. These manufacturers had previously been able to use some natural rubber to comply with this requirement.

The subsection took the following position which it presented to a meeting of Technical Committee A in Detroit, Mich., March 14.

1. The revised tables should not be changed further.

2. The publication by SAE and ASTM of the revised tables for D735 should be withheld for the duration of the emergency.

3. During the emergency the 1948 tables should remain in effect, and a footnote should be inserted that the emergency specification for elongation should be 70% of the published values.

Committee D-11 voted to delay action in ASTM on the revised tables and then take action in line with that of the SAE-ASTM Technical Committee A.

The Goodyear Tire & Rubber Co. in a letter to D-11 suggested that rubber compound tables similar to those in D735 for automotive rubber be developed for all other major rubber products. It was recommended that a new subcommittee be formed to begin work on this project.

In the discussion that followed it was mentioned that the ISO through Dunlop Rubber Co. had referred to both the ASTM tables in D735 and similar tables developed in the Netherlands, identified as N-1001, and Dunlop had also expressed an interest in an overall set of rubber compound tables.

Committee D-11 voted to form a new subcommittee to develop tables for rubber compounds similar to those in D735; these new tables are to be for products other than automotive.

The resignation of M. G. Schoch, Jr., Hewitt-Robins, Inc., as chairman of the belting subcommittee and of R. M. Howlett, Standard Oil Development Co., as chairman of the subcommittee on properties of rubber in liquids was announced. W. Newlin Keen, du Pont, will replace Mr. Howlett, but no new chairman for the belting subcommittee had been selected at the time of the Cincinnati meeting.

### Subcommittee Meetings

**Subcommittee 4—Protective Equipment for Electrical Workers.** Gordon

Thompson, Electric Testing Laboratories, Inc., chairman. No meeting of this subcommittee was held, but the chairman reported by letter that the specification for linemen's gloves had been completed and is being letter balloted in the subcommittee. The NPA restrictions on the use of natural rubber will not cause difficulty in meeting the specifications for other protective equipment, such as insulating line hose, insulator blankets and sleeves, etc.

**Subcommittee 5—Wire and Cable.** John T. Blake, Simplex Wire & Cable Co., chairman. Revisions in some of the items of the letter ballot for D470-49T, on wire and cable, were discussed at some length. There was also considerable discussion of polyethylene and Butyl power cable specifications. A definition of polyethylene as a base material for insulation is to be worked out with Committee D-20 on Plastics. Specifications for polyethylene as a "stabilized resin," i.e., resin plus antioxidant, are to be developed from existing data, and then specifications for electrical values for insulation made from such polyethylene are to be prepared.

Properties of Butyl rubber for insulation including tensile, elongation, water absorption, etc., are to be reviewed in connection with the development of specifications for power cable made from this type rubber.

Two alternate methods for determining the temperature coefficient of insulation as a part of D257-49T were referred back to the test section for further work.

**Subcommittee 6—Packings.** F. C. Thorn, Garlock Packing Co., chairman. The new tentative Method of Test for Compressibility and Recovery of Gasket Materials, approved by the D-11 letter ballot, except for two negative votes, will be adopted with the withdrawal of one negative vote and the lack of explanation in connection with the other. A section on the testing of thin gasket materials is to be established under R. G. Farnum, of F. D. Farnum Co.

**Subcommittee 8—Nomenclature and Definitions.** Harry L. Fisher, National Research Council, chairman. There was no meeting of this subcommittee at Cincinnati, but at the meeting of D-11 it was decided to ask the subcommittee chairman to forward some of the definitions to D-11 so that the members might have an opportunity to review them in advance of the preparation of a complete report by this subcommittee.

**Subcommittee 9—Insulating Tape.** R. H. Titley, Public Service Electric & Gas Co., chairman. The present rubber situation and the NPA-M-2 order have made necessary the preparation of emergency alternate specifications for friction tape and insulating tape, and it was voted that such emergency specifications should be accepted.

**Subcommittee 10—Physical Tests.** L. V. Cooper, chairman. In connection with the revisions in D412-49T, Methods of Tension Testing of Vulcanized Rubber, the speed of separation of the jaws of the testing machine was again discussed, and it was decided that the speed of 20 inches a minute should remain as stan-

dard, but that speeds up to 40 inches a minute should be permitted when agreed to by the parties concerned and when the speed used was noted on the reports of such tests.

The revisions and the rewriting of D15-41, Methods of Sample Preparation for Physical Testing of Rubber Products, now divided into three parts, mixing, curing, and preparation of the test specimen from piece or sample cured in other than a test slab, were discussed. A tentative write-up for the first two parts was submitted by the subcommittee chairman and the need of further changes and further work became apparent. One of the first problems is that of obtaining a standard natural rubber. After much discussion it was decided that the subcommittee should proceed with the establishment of a standard sample of smoked sheet rubber that could be specified according to a modulus range to be determined. It was accepted that after the first standard lot of about 50 tons was used up, the second standard lot might require some change in the modulus standard.

Standard samples of synthetic rubber will be provided by the Office of Rubber Reserve, except for Neoprene Type GN-A, where standard samples to date have not been possible because of changes in the properties of this polymer under ordinary storage conditions. The necessary provisions for providing standard samples of Neoprene GN-A are to be reviewed.

Standard samples of pigments will be used where available (ORR standard pigments) and regular commercial pigments used in other instances.

A task force will be set up to develop standard methods of determining and maintaining mill roll temperatures. Standard mixing procedure (addition of ingredients) will be prepared by A. E. Juve, B. F. Goodrich Research Center.

**Subcommittee 15—Aging Tests. G. C. Maassen, R. T. Vanderbilt Co., chairman.** Section 1 on the aging of plastic materials was provided with proposed tentative method of test for measurement of volatile loss from plastic materials and proposed tentative specifications for equipment to be used with this test, by R. C. Boyd, Bakelite Corp., of D-20 Committee on Plastics. These tentative specifications are being letter balloted in D-20, after which they will be made available to subcommittee 15.

Section 2 on oven *versus* shelf aging submitted a report showing the results obtained with GR-S, natural rubber, neoprene, Butyl, and nitrile type rubbers, after three years of shelf aging in comparison with artificial aging in the air oven at 158, 212, and 250° F. In addition to seven participating laboratories in the United States a complete set of specimens was sent to Liberia to be shelf aged. The section chairman, M. G. Shoch, Jr., asked for suggestions and comments regarding the best method of presentation of this data.

Section 3 on the unification of tests for natural and synthetic rubbers will offer its creep in tension test for comment and possible letter balloting for adoption as a tentative standard at the June meeting.

Section 4 on aging of natural and synthetic rubbers, headed by Gerald Rein-smith, Ordnance Department, U. S. Army, submitted a progress report of the work done since February, 1950. In connection with the effect of sulfur concentration and type of acceleration on the oxygen absorption of vulcanizates, it has been found

that the rate of oxygen absorption increases with increased sulfur concentration with both natural and GR-S black rubber stocks. State of cure and presence of antioxidants affect oxygen absorption testing to a lesser degree, as measured by rate of tensile degradation, than when the air oven or oxygen bomb are used. A series of stocks has been set up for aging studies at 75° F. in relative humidities of 0, 50, and 100%.

A photomicrographic technique for evaluation of the extent of ozone cracking of rubber is being investigated. A search has begun for a quantitative rather than visual method of determining the amount of ozone cracking. Studies have begun on the effect of waxes and chemicals as protectants against the action of ozone. The spray absorption device has been found to impart serious errors in the proposed ASTM ozone apparatus due to loss of volatile iodine being removed by the vacuum system.

A report #50-3354 entitled, "Evaluation of Service Tested, Aged Ordnance Tires," has been prepared. It is indicated that ozone is the most deleterious factor involved in the degradation and aging of stressed rubber parts. Examination and collection of data has begun on samples of aged Ordnance Department rubber goods returned from overseas storage.

Outdoor tests on several protective coatings have been completed and an outdoor exposure of six months considered to be the minimum has been met by only one commercial product and a Rock Island Arsenal neoprene formulation. A specification has been prepared covering these materials. A tire protected by a Butyl rubber sheath showed no indication of ozone cracks after four months' outdoor storage.

An extended plasticizer study has been started with the ultimate objective of elucidating the factors involved in the plasticizing effects of polar and non-polar plasticizers in polar and hydrocarbon types of rubber.

Section 5 on ozone aging reported on a round-robin test which had used the new method approved by the latest D-11 letter ballot. These tests had been run at 90° F. with an ozone concentration of 25 parts per 100 million, and some photographs of the samples after testing were circulated by Section Chairman Juve. Time for the first crack to appear varied from 1½-hour to two hours, and the time required for moderate-size cracks was between two and eight hours. The reproducibility of the test was therefore not too good. All the ozone testing apparatus used was prepared by the various laboratories except G. F. Bush Associates, where their commercial model was used.

Section 6 on the revision of specifications for oxygen and air aging reported on suggestions that had been made to reduce the oxygen pressure for bomb aging from 300 to 50 psi., and for approval of 80 instead of 70° C. as the temperature for testing. It was decided that although the reduction in pressure to 50 psi. of oxygen was feasible and the 80° C. temperature was gaining considerable favor, the 300 psi. oxygen pressure and the 70° C. temperature should remain as standard. A note is to be added to D572-48 to the effect that the 80° C. should not be used for compounds that are not heat resistant.

**Subcommittee 17—Hardness, Set and Creep. S. R. Doner, Manhattan Division, Raybestos-Manhattan, Inc., chairman.** In the absence of the subcommittee

chairman, Mr. Carpenter reported that a section had been established to study the recently developed new model of the Pussey & Jones plastometer. In the meantime D531-49 will be reverted to tentative status pending investigation of the new model of this machine.

The section on stress relaxation is planning a round-robin test with four soft rubber gasket stocks under conditions from low to high degrees of stress relaxation.

There was a discussion of the possible change in test conditions (jig temperature) for D395-49T on compression set, and a report of results using cold rather than hot jigs was submitted. A report by Binney & Smith Co. on this same problem also was circulated. It was decided that more work had to be done before a decision on this matter could be reached, such work to include possibly a statistical analysis of the data obtained.

The section on low temperature compression set reported that the proposed method will be submitted for letter ballot in the subcommittee.

A report on a comparison of hardness testing instruments, which included the Shore A, Rex gage, Bush durometer (German type), and the Wallace hardness meter (English type), was submitted. Further work is to be done on this project, and the subcommittee chairman emphasized that the rubber industry is in the need of a better portable hardness tester than is available at the present time.

**Subcommittee 20—Adhesion Tests. L. E. Cheyney, Minnesota Mining & Mfg. Co., chairman.** This subcommittee, which has been inactive, is in the process of reorganization. Several suggestions for changes in D429-47T, Methods of Test for Adhesion of Vulcanized Rubber to Metal, resulting from the ISO-Technical Committee 45, Rubber, meeting in Akron, last October, were discussed, and task groups were authorized to investigate these points. It was also decided to ask the ISO committee to provide data to support its suggested changes in the D429 specification.

**Subcommittee 21—Cements and Related Products. J. F. Anderson, B. F. Goodrich Co., chairman.** D816-46T, Methods of Testing Rubber Adhesives, was reviewed, and after incorporation of certain changes in wording this method will be recommended for classification as a full standard. There was a long discussion of changes to be made in the method for testing the adhesion of bonded brake lining. The scope of this method is to be enlarged. Bendix Corp. is to prepare a report on the testing of bonded brake linings by ultrasonic waves. B. B. Brombaugh, Inland Mfg. Division, General Motors Corp., was complimented on his contribution to the development of methods for testing bonded brake linings.

**Subcommittee 23—Hard Rubber. H. J. Flikie, Goodrich, chairman.** The section on asphalt battery containers is beginning an investigation aimed toward the development of a method of impact testing of these containers. The section on hard rubber reviewed the program of June, 1950, and heard the reports of four task groups working on methods for tensile, elongation, impact, and hardness testing. Poor correlation between tests made in different laboratories is still a major problem.

**Subcommittee 25—Low Temperature Tests. R. S. Havenhill, St. Joseph Lead Co., chairman.** O. H. Smith, United

States Rubber Co., presented a summary of the paper entitled, "Retraction Test for Low Temperature Performance," by A. W. Meyer, W. A. Hermonat, and himself, which has been published in the February, 1951, issue of *Analytical Chemistry*. The retraction test, which is a variation of the T-50 test, may be used to determine accurately the low temperature merit of both crystallizable and non-crystallizable stocks. TR10 and TR70, i.e., the temperature at which the sample after cooling to  $-70^{\circ}\text{C}$ , retract 10 and 70%, were shown to correlate with hardness, torsion twist, and compression set. As a practical application of the test, Dr. Smith said that gaskets should be made from stocks having a TR70 value of less than  $-45^{\circ}\text{C}$ . A further review and discussion of this method is scheduled for the June meeting of the subcommittee.

A draft of a tentative method of test for Brittle Temperature of Plastics and Elastomers by Impact, as prepared by Committee D-20, was circulated by Mr. Boyd. It was suggested that for testing rubber stocks, air preconditioning should be used before liquid immersion and testing. The method, as amended, will be letter balloted by D-20; then it will be circulated again in subcommittee 25.

A report on an evaluation of various resistance wires provided by the American Instrument Co. for use with the Gehman low-temperature flexibility tester was presented by B. G. Labbe, of the University of Akron Government Laboratories. The values obtained resulted in the selection of the yellow code wire (torsional constant, 0.500 grain-centimeters per degree of twist) as the best of the group for use at a standard. The subcommittee agreed to adopt the yellow wire as standard and to include a note in D1053-49T, Measuring Low Temperature Stiffening of Rubber and Rubber-Like Materials by the Gehman Torsional Apparatus, that if other wire were used the test results should include mention of the type-wire used.

**Subcommittee 27—Resilience.** E. G. Kimmich, Goodyear, chairman. Two papers were presented at the meeting of this subcommittee on problems related to its work, i.e., to arrive at standardization of the essential requirements of forced vibration tests for determining dynamic modulus and resilience (or hysteresis).

G. W. Painter, Lord Mfg. Co., gave a paper entitled, "The Measurement of the Hysteresis and Dynamic Modulus of Elastomers by a Vector Subtraction Method." He demonstrated the method at the meeting by means of the actual apparatus he had developed for such measurements. By using a mechanical stroking device and electrical pick-ups, he obtains a reading on a vacuum tube voltmeter. Calibrations permit the voltmeter readings to be converted easily to dynamic modulus or resilience, depending on the adjustment of the apparatus. The sample used is the du Pont shear sample adhered to metal members, but it was stated that unbonded specimens could be used with some lateral pressure.

Lloyd Muller, Buick Motor Division, General Motors, gave a paper entitled, "The Buick Motor Mount Testing Machine." By means of slides Mr. Muller showed the details of his apparatus and of hysteresis loops produced on the cathode ray oscilloscope. The samples used are actual motor mounts or standard D429 adhesion specimens.

Mr. Muller's apparatus is adapted to the additional task of determining the flexing endurance of a motor mount or similar product and the changes that occur in

dynamic modulus and hysteresis during the flexing test. The flexing phase overlaps the functions of subcommittee 18, and a copy of the report was sent to the chairman of that subcommittee.

A section was authorized to proceed with the development some time ago of a standard method of test for resilience, using forced vibration methods, and with this new information more progress is anticipated on this work in the near future.

## D-11 Crude Rubber Subcommittee Washington Meeting

The fourth meeting of subcommittee XII on crude natural rubber of Committee D-11 on Rubber and Rubber-Like Materials of the American Society for Testing Materials was held in Washington, February 27, with Norman Beddedahl, National Bureau of Standards, chairman, presiding.

The chairman first mentioned that he had received a letter from R. G. Newton, British Rubber Producers' Research Association, London, England, stating that Newton had been appointed coordinating officer for technically classified rubber, with the task of collating reports from the consumers and producers of crude natural rubber.

C. B. McKeown, Goodrich, head of the task group on dirt in rubber submitted a report on methods for measuring quantitatively the dirt content of crude natural rubber. Two methods, the hot oil and the modified solvent method of the American Chemical Society, appear satisfactory. These methods have, to date, given reproducible results within satisfactory analytical limits. Considerable additional checking will be necessary, however, to prove completely that the methods are analytically sound. There are also a number of points yet to be covered with respect to the application of any quantitative procedure for dirt content within the framework of the current natural rubber grading practice.

The task group decided originally that three methods were worthy of investigation: namely, the modified A. C. C. solvent method submitted by the Dunlop Tire & Rubber Corp.; the visual method submitted by Goodyear; and the hot oil method submitted by Goodrich.

The modified A. C. S. solvent method with various refinements to permit increased speed of analysis and overall simplification was chosen for investigation primarily because the dirt could be removed from the rubber without significantly changing its physical appearance.

The visual method is based on the preparation of plastic sheets containing known amounts of dirt such as would be seen in natural rubber and the use of these sheets for quick comparison and evaluation of the rubber samples at hand. It was pointed out that if the visual method could be worked out, it might become the most useful method since it would not receive the possible objections that any quantitative analytical procedure would at the receiving and grading points for crude natural rubber.

The hot oil method was investigated because it involves the use of a one-pound sample, which, because of its size, was considered somewhat more representative than the samples taken for the other methods.

Fifty pounds each of No. 1 ribbed smoked sheets and No. 4 remilled blankets were mill blended, and samples distributed to the task group members for analysis. Results, complete on the hot oil method

only to date, gave high, low, and average values respectively of 0.03, 0.01, and 0.02% for the No. 1 RSS, and 0.92, 0.77, and 0.83% for the blended No. 4 blankets. The modified A. C. S. solvent method, with only two laboratories reporting to date, gave 0.07, and 0.01% for the No. 1 RSS and 0.93 and 0.72% for the No. 4 blankets.

If plastic sheet standards can be made that will correlate with the analyzed dirt content of crude natural rubber, the visual method may provide the necessary speed of testing required by the existing grading systems. J. J. Hoesley, Goodyear, has done the work on preparing the plastic sheet standards, and it appears that there may be some chance of making this method workable.

The task group plans to improve the procedure for the modified A. C. S. solvent method and make further checks on its reproducibility. There will also be more work on the visual method and the hot oil method. Finally, a Proposed Tentative Specification for Dirt in Rubber will be prepared and submitted to the subcommittee and to Committee D-11. It was also suggested that a paper describing the methods be written and submitted for publication in the *ASTM Bulletin*.

W. James Sears, vice president of The Rubber Manufacturers Association, Inc., and chairman of its crude rubber committee, who had been invited to attend the meeting of subcommittee XII, next described the scope and activities of the RMA committee. Representatives from the purchasing departments of 13 rubber goods manufacturing companies comprise the RMA crude rubber committee. These companies are: Goodrich, Boston Woven Hose & Rubber Co., Firestone, Dayton Rubber Co., Dunlop Tire & Rubber Co., General Tire & Rubber Co., Goodyear, Hewitt-Robins, Lee Tire & Rubber Co., Mansfield Tire & Rubber Co., U. S. Rubber, Whitehead Bros. Rubber Co., and Armstrong Rubber Co.

The major problems and functions of the RMA crude rubber committee were described in some detail by Mr. Sears, as follows:

1. Commercial practices of rubber producers and dealers in the Far East are under continuous examination by the RMA in cooperation with the Rubber Trade Association of New York.

2. Miscellaneous quality problems are considered. In this connection it was mentioned that the RMA committee had done some work on classified rubbers recently offered by Indo-China producers. Consuming companies in the United States are sympathetic and interested in this project, it was said.

3. One of the major activities of the RMA crude rubber committee is the preparation and maintenance of type samples in accordance with the Crude Rubber Type Descriptions as adopted by the RMA and endorsed by the RTA. The RMA committee has been trying for the last four years and at a cost of \$60,000 to duplicate the 1938 type samples, but until recently had only succeeded in providing new type samples for No. 1 through 5 RSS.

After the last meeting of the International Rubber Study Group in Brussels, Belgium, in May, 1950, it was decided to discontinue attempts to match the 1938 type samples exactly on the other grades of rubber and to be content with the closest approach possible. Matching the color of the 1938 samples was the main difficulty.

By January 1, 1951, 25 books of samples containing in addition to the five grades of smoked sheets, three grades of browns

and ambers, have been prepared and distributed, and 75 more such books of samples are in the process of preparation.

4. Temporary Packing specifications for Crude Natural Rubber, effective January 1, 1951, have been prepared. These packing specifications were limited in their scope by the materials available in the Far East for packing and handling rubber, it was said.

5. The RMA crude rubber committee participates in arbitration proceedings, most of which are carried out under RTA rules. With the government the sole buyer of natural rubber there are no more private arbitration proceedings. The General Services Administration recently established a "reinspection panel" composed of one representative each from the RMA, the RTA, and the Far Eastern shippers. Decisions of this panel are binding on rubber producers, shippers, and consumers.

6. The RMA committee also works with the Far Eastern Shipping Conference on shipping problems and importing contracts and is at present helping the government with its contracts.

7. Advice to the government on stockpiling, warehousing, rotation of stocks, etc., is also a function of the RMA committee.

Mr. Sears stated that the RMA crude rubber committee had not been very active since the outbreak of hostilities in Korea because the members of the committee were more than usually occupied with company business and specific government agency activities. It is difficult to determine what can be done by the RMA committee while the government is the exclusive buyer of natural rubber. With the present supply-demand position on natural rubber, it is not likely that much progress in improving RMA specifications can be made until the country's stockpile is accumulated and enforcement of specification details can be made more rigorous, it was said.

L. V. Cooper, chairman of the task group on compounding formulae and test procedures for evaluating crude natural rubber, which is made up of representatives of Firestone, Goodrich, General Tire, Lee, and NBS, presented a report of the work done since August 1950 on this project.

About 15 round-robin tests were made using the A. C. S.—I compound between August, 1950, and March, 1951. From the beginning, one of the participating laboratories reported low figures for modulus at 600% elongation. It was determined early in the work that the variation in modulus values, with special reference to the laboratory reporting the low values, was due to some variation in mixing, aging, or curing. Changes to a larger batch size, the establishment of nearly identical mixing times at all laboratories, the use of the same pyrometer for determining mill roll temperatures, an investigation of the effect of mixing temperatures, and finally the use of the same ingredients from one laboratory at all laboratories, with a representative from the laboratory supplying the ingredients present at all the other laboratories during mixing, still showed that modulus figures from one laboratory were lower than those obtained from the other laboratories.

Many other possible reasons for the modulus variation were discussed including the type of mold lubricant used, the effect of the relative humidity existing in the various laboratories during mixing, the effect of hand died versus machine died test specimens, etc.

Mr. Cooper also presented a report on the results obtained with about 242 bales

of technically classified rubber from Indo-China. Included also were results obtained on 13 bales of technically classified rubber as received from Malaya.

The rubber from both sources did not check the plasticity figures marked on the bales. Other countries have also accepted the French system of marking for plasticity and for cure rate so that rubber from different locations is similarly marked.

Modulus and tensile strength figures were presented showing the range of values found for the red, slow curing, low modulus rubber; yellow, medium curing, medium modulus; and the blue, fast curing, high modulus rubber. Although the modulus values were not always within the range specified, the classified rubbers did show the proper trend from low to medium to high values. Grouped within the curing rate classifications according to plasticity markings, even though the plasticity markings could not be checked when tested in the consumer's plant, the following values were reported:

ANALYSIS OF CLASSIFIED RUBBER FROM FRENCH INDO-CHINA  
(Modulus at 600% in PSI.)

Plasticity Mark and Mooney Units	Red		Yellow		Blue	
	Slow Curing	Low Modulus	Medium Curing	Medium Modulus	Fast Curing	High Modulus
— Less than 73	200-625 (426)		600-1775 (1158)		1375-2225 (1692)	
O 75-87	325-900 (565)		500-1925 (802)		1125-2150 (1620)	
X More than 87	425-650 (558)		550-1525 (880)		1750	
Modulus Spec.	Less than 426		426-711		More than 711	

N. B. Bracketed values are averages

The classified rubber from British Malaya, all marked as slow curing, low modulus rubber, gave values for the 600% modulus ranging from 450 to 950 psi., with an average of 760 psi.

The modulus and tensile tests were all conducted at the Firestone company, using the A. C. S.—I formula pigment mix with a five-minute milling time.

In the discussion following Mr. Cooper's report it was mentioned that the French were using Schopper rings for testing, the British either dumbbell strips or Schopper rings, and the U. S. only dumbbell strips.

R. D. Stiehler, NBS, pointed out that testing modulus at 600% elongation introduces the effect of crystallization and stiffening of the rubber and that the modulus at an elongation below the point of crystallization would supply more information.

In discussing the A. C. S.—I recipe the subcommittee chairman reported that a letter received recently from Dr. Newton stated that Captax accelerator from four different sources used in testing in the laboratories of the BRPRA in England had shown no appreciable difference in vulcanization characteristics.

Dr. Stiehler mentioned that a comparison of the NBS strain tester and the model developed by the BRPRA in England had shown that the variation in results obtained with the BRPRA strain tester was only slightly less than that obtained with other standard testing machines and was much greater than that with the NBS tester.

Lewis T. Milliken, NBS, presented a report entitled, "Determination of Copper in Natural Rubber", which recommended an improved procedure for this determination. The essential difference between the new method and the previous methods was the use of a dry instead of a wet ashing procedure for the rubber sample.

C. O. Miserentino, Dunlop Tire & Rubber Co., also presented a report on the determination of copper and manganese in crude rubber, which was a proposed revision of ASTM D 297-43T. A round-

robin test on latex films by various methods including the wet oxidation method for copper had been run, and the results were found to be generally comparable. Mr. Miserentino stated that the sections on copper and manganese analysis of the subcommittees on latex and on chemical analysis of D-11 were both in agreement as to the value of the dry ash method.

John McGavack, U. S. Rubber, inquired regarding the use of spectographic methods for the determination of copper in rubber. Mr. Miserentino stated that these methods had been investigated and reported in the round-robin tests.

D. D. Wright, Hood Rubber Co., pointed out that in connection with colorimetric methods for copper determination, the type of photometer must be specified precisely.

Dr. Bekkedahl suggested that since the British and the French were using plasticity determinations in their grading systems for rubber, the subcommittee should have a task group to work on methods and specifications.

Glen E. Meyer, Latex & Rubber, Inc., reported that Socfin, Ltd., producer of technically classified rubber in Malaya, had investigated the increase in Mooney plasticity on storage and would like to send samples air mail to the United States for cross-checking. This company is also concerned about the testing error for Mooney determinations which caused difficulty in the classification of rubbers showing borderline values between two different classifications.

Mr. Cooper and Ralph T. LaPorte, Seiberling Rubber Co., took the position that a difference of as great as 20 Mooney units between two batches of rubber could be best eliminated by blending.

Mr. Wright reported that plasticity of the rubber as received and as mixed is being run by his company, but no correlation between these two values was found. He remarked that the footwear branch of the industry could not blend large batches of rubber to level out plasticity variations as was common practice in the tire industry.

Mr. Miserentino reported that he had attempted to correlate Mooney plasticity values with strainability and had had some success in this direction. Low Mooney value rubber was found to be more difficult to strain. Mention was also made of the proposal made by Dr. Stiehler at the ISO meeting in Akron, October, 1950, that a longer period of heating be required before testing for Mooney plasticity since this procedure seemed able to reduce the time required to get constant Mooney values with a given sample.

Dr. McGavack expressed doubt as to the value of Mooney values on crude natural rubber unless the date of the original test was included for use in connection with check tests made at a later date. He mentioned that the use of ammonia in the tapping cup would produce harder rubber.

Dr. Bekkedahl stated that the results obtained by the French rubber producers on change in Mooney value on storage showed much variation.

Dr. McGavack pointed out that the analysis of nitrogen content of crude natural rubber could be used to predict curing rate.

The subcommittee decided to hold its next meeting in Atlantic City, N. J., during the week of June 18, at the time of the ASTM annual meeting.

### D-20 Spring Meeting

Committee D-20 on Plastics, ASTM, and its subcommittees held their spring meeting March 27 and 28 at the Wardman Park Hotel, Washington. Chairman Gordon M. Kline, NBS, presided and was assisted by Secretary Bruce L. Lewis, Tinius Olsen Testing Machine Co.

The D-20 advisory committee met the evening of March 27. E. B. Cooper, of du Pont, and chairman of the D-20 special committee on the International Standards Organization Technical Committee 61, reported that a meeting had been held in Philadelphia, Pa., February 9. At this meeting it was agreed that an international meeting of ISO-TC 61 should be held in New York, N. Y., September 17 and, possibly, 18, immediately following the meetings of the American Chemical Society and the Union of Pure & Applied Chemistry. It was also agreed that the scope of ISO-TC 61 "shall be the standardization of test methods and nomenclature applicable to plastics and their raw materials, and to the finished products therefrom."

H. W. Paine, also of du Pont, reported that representatives of 14 companies met on November 30 to discuss the formation of the subcommittee on chemical cellulose. The formation of such a subcommittee has been approved by the ASTM board of directors. In reply to a request from the Society relative to the interests of D-20 in exposure testing, it was decided that this matter would be looked into by the subcommittee on permanence. A program on weathering at the ASTM exposure test sites will probably be initiated. The advisory committee also set up a new committee, the editorial committee, which will function as a clearing house for new methods as they are developed.

At the D-20 meeting held the afternoon of March 28, the above matters were explained to committee members. It was also voted to hold the next D-20 meeting at Atlantic City during the same week as the ASTM annual meeting. The fall meeting will be held at Niagara Falls, Ont., Canada, at a date to be announced.

### Symposium on Plastic Testing

Six papers on plastics testing were presented in a symposium held March 28 in conjunction with ASTM Committee D-9 on Electrical Insulating Materials. The papers follow: "Constant Deflection Stress Relaxation Tests for Plastics," R. Burns and E. E. Wright, Bell Telephone Laboratories, Inc.; "Heat Distortion of Polystyrene," H. J. Clearman, J. L. Williams, and H. J. Karam, Dow Chemical Co.; "A Simple Rheometer for Measuring Melt-Flow of Polythene," J. P. Tordella, du Pont; "Thermal Properties of Certain Laminated Plastics," E. M. Schoenborn, A. A. Armstrong, and K. O. Beatty, Jr., North Carolina State College; "Effect of Plastics Vapors on Electrical Arcing," L. E. Germer, Bell Labs; and "Rapid Test Method for Classifying Parallel and Perpendicular Electrical Quality of Mica Films," K. G. Cootlee, Bell Labs.

The paper by Burns and Wright described a new method for determining

flow of materials while keeping deflection changes constant. The paper by Clearman, Williams, and Karam showed conclusively that when polystyrene is annealed at suitable temperatures, the heat distortion increases very considerably. The lower heat distortion values obtained with unannealed material is believed to result from strains caused by molding. Mr. Tordella described a method for measuring the melt-flow of polythene where the material is melted and forced under a definite pressure through a capillary tube. The weight of plastic extruded during a time interval is measured, and from this the flow characteristics can be determined.

Chairman of this symposium was Charles R. Stock, of American Cyanamid Co., who is also chairman of Subcommittee VIII on Research, which sponsored this program.

### NBS Open House

The National Bureau of Standards held open house the evening of March 28. A large number of D-20 and D-9 members was shown through the laboratories, including those concerned with resistance measurements, electrical instruments, dielectric measurements, organic plastics, and others.

### Subcommittee Meeting

**Subcommittee 1—Strength Properties of Plastics.** M. E. Marks, Columbia Chemical Division, Pittsburgh Plate Glass Co., chairman. Method D695-49T on compressive strength has been completely revised and sent to a letter ballot of D-20. An investigation is planned on the usefulness of the ski-ball impact test developed by American Cyanamid Co. The subcommittee is cooperating with D-9 on revisions of the present impact test, D256-47T, to make it more applicable to styrene plastics. The section on flexural strength is attempting to adapt D790-49T so that it can be used for testing thin, narrow specimens. A new method has been developed, and is being submitted to letter ballot, on determining the bursting strength of laminated tubes. Under the joint sponsorship of ASTM and SPI an investigation is being made on the tear strength of thin plastic films, and a new method for tear strength may be added in the near future. A new section is working on methods for determining the dynamic properties of plastics. The subcommittee recommended that Methods D952-48T on bond strength and D1043-49T on stiffness properties be advanced to standard methods.

**Subcommittee 2—Hardness Properties of Plastics.** L. W. A. Meyer, Tennessee Eastman Division, Eastman Kodak Co., chairman. The section on abrasion—optical effects is setting up a round robin to test the usefulness and reproducibility of the Taber abrasion machine, using a large number of different plastics. The section on abrasion—mechanical effects has collected data on the Armstrong abrader, Olsen Wearometer, and the Taber wear tester, but the data so far collected are not very reproducible, and the work may be extended to include other machines.

**Subcommittee 3—Thermal Properties of Plastics.** E. B. Cooper, chairman. The section on deformation under load is investigating the use of an air bath instead of oil. The SPI flammability tester was discussed as being very accurate and reproducible and is expected to become standard for thin films. A new method has been devised for determining flow characteristics of plastics by forcing them

through an orifice under standard pressure and temperature conditions. Work is being carried on with the heat distortion test to determine the effect of specimen size and the need of specifying the type of conditioning used. Method D746-44T on low temperature brittleness has been revised as to the method of reporting results.

**Subcommittee 4—Optical Properties of Plastics.** H. K. Hammond, NBS, chairman. Method D1003 on determining haze by the integrating sphere was discussed with respect to the need of changes in the geometry. Method D523 for determining gloss was recommended for advancement to a standard. A new section was organized to determine methods for measuring color differences in plastics. It was voted to remove D672-45T, on photoelectric measurement of haze, from the list of methods.

**Subcommittee 5—Permanence Properties of Plastics.** J. W. Mighton, Dow, chairman. It was decided that tests for determining the resistance of vinyls to liquids be conducted at 25° C. A short summary was given of the outdoor weathering tests being conducted by Army Ordnance in New Jersey, New Mexico, Panama, and the Arctic. Special tests are being carried out to determine if exact control over conditions is needed in accelerated weathering tests. New methods for determining the effect of heat on plastics were outlined as follows: (1) an oven-air test which involves passing heated air over the sample at a controlled rate; and (2) an SPI test which involves the removal of water or plasticizer by means of activated charcoal. A new method for measuring warpage of plastics was discussed and sent to a letter ballot of D-20. It was recommended that D1042-49T on measuring changes in linear dimensions be advanced to standard.

**Subcommittee 6—Specifications for Plastics.** Lucius Gilman, Pickatinny Arsenal, chairman. Revisions were recommended in the specifications on polystyrene, cellulose nitrate, cellulose acetate, cellulose acetate butyrate, ethyl cellulose non-rigid vinyl chloride, nylon, allyl plastics, cellulose propionate, alkyd molding materials, phenolic moldings, amino plastics, laminated thermosetting plastics, and polyester plastics.

**Subcommittee 7—Analytical Methods for Plastics.** D. E. Northrup, Tennessee Eastman, chairman. A method for determining plasticizer, in cellulose plastics was discussed, and it appears that the best solvent is isopropyl ether containing peroxide. Methods were considered for determining volatile materials in vinyls, with a method using heat considered to be best. Methods for determining average particle size are being developed, and the peroxide bomb test is being used for determining total chlorine. The determination of viscosity in a preliminary survey indicates that the best method is to dissolve the plastics in a solvent and determine viscosity by the Ostwald method. Previous tests to determine plasticizer heat stability were not reproducible, and a new round-robin test is being set up on this problem.

**Subcommittee 9—Molds and Molding of Plastics.** J. L. Williams, chairman. A discussion took place on the compression mold used for making tensile specimens. A method for determining bulk density of plastics is being revised. The revision of D955-48T, on mold shrinkage, to include use of a four-inch drain-type cup has passed the D-20 letter ballot. Method D1046-49T, on transfer molding of pheno-

lic specimens, has been recommended as a standard and has been sent to letter ballot.

**Subcommittee 10—Definitions for Plastics.** C. H. Alexander, B. F. Goodrich Chemical Co., chairman. Many terms on nomenclature of various plastics were discussed and are being sent to a letter ballot of D-20. Many definitions on tensile strength were discussed, and work on correlating these definitions with those used by Committee E-1 is proceeding rapidly.

**Subcommittee 11—Conditioning of Plastics (Jointly with D-9).** C. R. Stock, American Cyanamid, chairman. This committee's main interest at present is in methods for determining humidity, and it is requested that any accurate and precise methods available be brought to the attention of the chairman in order that they may then be tested.

## Pennock on Mold Design

**A** TALK on molds and mold design by Frank Pennock, Oliver Tire & Rubber Co., was the feature of the March 29 meeting of the Northern California Rubber Group. Some 47 members and guests were present at the Berkeley Elks Club.

Mr. Pennock listed the following factors to be considered in designing a mold for making a rubber product:

(1) Size and shape of part to be molded. The part must not be too big for the available press and hydraulic system.

(2) Number of units to be produced. Enough cavities must be made to produce the desired number of parts with economical use of the press.

(3) Trim of the product. The design of the overflow cavity is important; it should have enough volume to compensate for inequality in stock preparation. If the shape of the product permits, a punch trim is usually the most economical.

(4) Stock preparation for molding, including extruded blanks, die blanks, mill slabs, and calendared sheets.

(5) Curing time. If it is possible to reduce curing time, the number of cavities may be reduced for a unit of production. Factors involved include proper heat transfer from press platens, shielding of mold and press from air currents, preheated stock and inserts, and minimum mold loss during change time.

(6) Change time, which can be reduced by the following items: air cylinders to break open the mold; tracks to guide the mold from the press; loading boards to fill multiple-cavity molds; hinged molds with guide pins and handles to reduce operator fatigue and mold maintenance; quick operating valves; and molds sprays and air hoses.

(7) Type of mold. Compression-type molds are most generally used. Injection and transfer type of molds are good for close tolerances and fine flash.

(8) Size of press limits size of article. In addition to the pressure limitation of the press, proper daylight opening must also be considered.

In reply to questions from the floor Mr. Pennock recommended an RMS 40 finish for ordinary work; while for finer finishes it is usually necessary either to chromium plate or harden and grind the mold. The speaker also noted that the question of proper venting can only be answered by experience with each mold.

## Synthetic Rubbers and Titanium Dioxide Discussed

**T**HE New York Rubber Group held its spring meeting on March 30 at the Henry Hudson Hotel, New York, N. Y. Approximately 300 members and guests were present at the afternoon technical session, at which four talks were given, while 260 attended the dinner that followed a cocktail hour. Talks at the technical session were on: "Polyacrylic Rubbers—Their History and Potential Uses," by Roger C. Bascom, B. F. Goodrich Chemical Co.; "Silicone Rubber—Its Characteristics and Present and Future Uses," C. W. Pfeifer, General Electric Co.; "Poly-sulfide Rubber—Present Development and Trends," Joseph S. Jorzak, Thiokol Corp.; and "Titanium Dioxide—Its Application in Rubber and Plastic Compounds," Joseph Breckley, Titanium Pigment Corp.

Mr. Bascom said that Hycar P.A. (polyacrylic) rubbers are recommended for use in applications requiring one or more of the following properties: excellent resistance to temperatures up to 350° F.; outstanding resistance to service in sulfur-modified oils at high temperatures; resistance to oxidation at normal and elevated temperatures; excellent flex life and cut growth resistance; resistance to sunlight, ozone, oils, and certain solvents (other than aromatic hydrocarbons); resistance to permeability by gases such as hydrogen, helium, and carbon dioxide; and permanence of colors in both white and pastel shades.

Polyacrylic rubbers are not recommended for applications which require flexibility below -10° F., or very high resistance to water, steam, ethylene glycol, and similar materials. Extensive laboratory test data were presented by the speaker to illustrate properties on which these advantages and disadvantages are based. Other points brought out in the talk were that the crude polyacrylic rubbers require no antioxidant and can withstand long time storage; the rubbers are mixed and processed by conventional methods, but require no softener, are cured by a combination of amine and sulfur (with the sulfur acting as a retarding modifier), and zinc oxide must not be used because of its strong retarding effect on the cure.

Applications for polyacrylic rubbers include oil seals for high-temperature use; white and pastel-colored compounds that do not discolor in service; adhesives that remain pressure sensitive over extended periods of time; and pigment binders for attaching colors to Fiberglas cloth and leather. Potential uses include paper saturation, coating, and other unvulcanized latex applications. Mr. Bascom concluded.

Mr. Pfeifer stated that the silicone rubber picture is now undergoing a very rapid change as a result of advances in technology, and applications are no longer limited by the low physical properties and poor handling qualities characteristic of the rubbers when they were introduced a decade ago. The ability of silicone rubber to withstand service temperatures of -100 to +500° F. has been made use of in a number of military applications; while the excellent electrical properties of silicone rubber coupled with the wide temperature range make it ideal for many wire covering applications.

After a brief discussion of the manufacture, compounding, and fabrication of silicone rubbers, Mr. Pfeifer described and showed samples of typical applications, including wire and cable insulation, tapes, connectors, and seals in the electrical

field; spark plug sleeves, fluid transmission seals, hydraulic brake boots, spark plug grommets, and diesel engine gaskets in the automotive field; gaskets, door seals, fin dampers, shock mounts, and universal joint boots for aircraft use; and steam iron seals, range gaskets, flood light gaskets, and others in the appliance field.

Mr. Jorzak said that continued research on the polysulfide rubbers has aimed at developing polymers with improved properties, and many major advances have been made in this direction during the past seven to eight years. The work on new polymers is designed to (1) improve low temperature flexibility without use of plasticizers and without sacrificing solvent resistance; (2) improve the service range by raising the high temperature limit; and (3) introduce reactive terminals and side groups which will permit covulcanization with existing synthetic rubbers of the non-polysulfide types. Some advances have been made toward attaining all three of these objectives.

Studies on "Thiokol" Type ST have led to the development of a series of liquid polymers, and most recent applications for polysulfide polymers are based on these liquids which have found use in sealers, impregnants, casting compounds, and paints. General properties of the converted liquid polymers are similar to those of Type ST. New liquid polymers have been made with various reactive terminals and side groups, and the interaction of these polymers with epoxide, phenolic, and furfuryl alcohol resins results in materials which are intermediate between resins and rubbers.

Mr. Breckley began his talk with a review of the occurrence in nature of titanium, the manufacture of titanium dioxide, and the forms of the pigment. Titanium dioxide is available in two crystalline forms, anatase and rutile, having different optical properties. These two forms, therefore, develop different tinting strengths in rubber and plastic and give products of differing light stability. The speaker used slides and samples to illustrate the differences in optical properties of the rutile and anatase forms and the effect of these properties in rubber and plastics compounds. The pigment forms also differ in their water dispersing characteristics; water slurries of some grades are more stable than others, and this difference is of importance in the pigmentation of latices.

Group Chairman M. R. Buffington, Lea Fabrics, Inc., announced the appointment of the following committee to nominate officers and executive committee members for 1952: Otto J. Lang, Vulcan Proofing Co., chairman; D. E. Jones, American Hard Rubber Co.; Bryant C. Ross, Sharples Chemicals, Inc.; and C. O. Davidson, Binney & Smith Co. The committee will present its slate of candidates at the fall meeting. Members who wish to present nominations for any of the offices should communicate with Mr. Lang.

## A. I. C. Annual Meeting

**T**HE American Institute of Chemists will hold its annual meeting on May 9-11, at Niagara Falls, Ont., Canada, to consider what constitutes the new responsibilities of chemists and how they can

increase production to meet current military and civilian demands.

A feature of this program is four symposia to be held May 10 and 11. The first, "Transforming Results of Research into Production," is under the chairmanship of Burt Wetherbee, Wetherbee Chemical Co., and comprises six papers, including "Rubber, Plastics, and Chemicals—The Human Element," by H. P. Dinsmore, Goodyear Tire & Rubber Co., and "Petroleum Chemistry," by W. J. Sparks, Esso Laboratories. The second symposium, "Professional Education of the Chemist," also includes six papers under the chairmanship of Professor E. R. Riegel, University of Buffalo.

"Responsibilities of the Chemist in a Changing World" is the subject of the third symposium, with G. F. Ruger, Diamond Alkali Co., as chairman. Five talks will be presented, including a paper on "The Responsibility of the Chemist to His Profession" by Harry L. Fisher, National Research Council. The fourth symposium, "Progress in Research," will be led by L. F. Hoyt, National Aniline Division, Allied Chemical & Dye Corp. Among the seven papers to be given are "Benzene from Petroleum—How and How Much," by Gustav Egloff, Universal Oil Products Co., and "Progress in Silicones," W. A. Wiard, Dow-Corning Corp.

Other highlights of the three-day meeting include an Honors Recipients Luncheon on May 11, where James M. Crowe, *Chemical & Engineering News*, will speak on "News of Scientific and Technical Developments"; a panel discussion on May 11 entitled, "Relationships between Management and Technical Personnel," with E. R. Whitford, Oldbury Electrochemical Co., as chairman; and the presentation of the Institute's Gold Medal to Prof. Harry N. Holmes, Oberlin College, at a banquet on May 11. The Medal will be presented by Dr. Fisher, and speakers for the medalist will be Prof. J. A. Campbell, Oberlin College, and Alden Emery, American Chemical Society.

## Analytical Methods for Rubber

THE newly organized Kitchener Rubber Group held its second regular meeting on March 20 at Dominion Tire Co., Kitchener, Ont., with 62 members and guests attending. Speaker of the evening was J. B. Roberts, United States Rubber Co., who discussed "Analytical Methods Used in the Rubber Industry." W. H. Bechtel, Kaufman Rubber Co., acted as meeting chairman, while W. R. Smith, Dominion Tire, was secretary.

Mr. Roberts discussed rubber analytical methods used by the Detroit laboratories of U. S. Rubber's tire division. Special emphasis was placed on analyses that can be performed quickly. In addition to accuracy, an analysis must be rapid to be of value in rubber chemical control. The speaker briefly described the method in use for handling the tremendous number of free sulfur determinations made each week at Detroit, as well as difficulties encountered in analyzing pigments such as carbon black, zinc oxide, titanium dioxide, and others. Mr. Roberts concluded his talk with a description of rubber analysis by means of the spectrophotometer, using charts of typical spectrophotometric curves to illustrate the application of this method.

## Quebec Group Hears Smith

THE Quebec Rubber & Plastics Group held its annual ladies' night and dance on March 2 at Victoria Hall, Westmount, P. Q., Canada. More than 230 members, guests, and their wives attended the function, which included supper and a drawing for a number of door prizes donated by local firms associated with the Group.

The Group held a regular dinner-meeting March 29 at the Queen's Hotel, Montreal, with a record number of 116 members and guests attending, including members of the Montreal Paint & Varnish Group. Speaker of the evening was W. R. Smith, Godfrey L. Cabot, Inc., who discussed "The Behavior of Carbon Black in Rubber and Plastics." A cocktail hour, sponsored by Cabot, preceded the dinner, and the meeting included a showing of a Cabot film on the methods used in manufacturing carbon black.

Dr. Smith pointed out that while the effectiveness of carbon black as a reinforcer for rubber has long been recognized, the effect in plastics at loading comparable to those used in tire treads has not been studied so fully. During the past two years experiments have been carried out with a number of plastics, including polyethylene, polystyrene, and polyvinyl chloride. A range of carbon blacks at 30-50 parts loading has been studied, and the general results have been found to be the same in all cases. In general, the stiffness and softening points of the compounded plastics are greatly increased, and the impact strength is considerably reduced.

The remarkable reinforcing effect of carbon black in rubber is not in evidence in plastics, Dr. Smith stated, and used molecular models to demonstrate that this result is not unexpected. Since the effectiveness of carbon black undoubtedly involves some type of cross-linking or association between the high-polymer chains, these effects will be most pronounced in materials where the forces between polymer chains are relatively weak and the cross-links few in number. Plastics have intense intermolecular forces, and the addition of further cross-links has little effect on physical properties.

The speaker stated that carbon blacks in loadings of 2-5% are able to improve the weather aging properties of most plastics. The effectiveness of the black in this regard probably involves two factors: the ability of the black to decompose peroxides; and the ability to screen the plastic from ultra-violet light. Although these effects have been generally overlooked in carbon black-rubber systems, they may prove to be significant factors in defining the reinforcing ability of carbon black, Dr. Smith concluded.

## Nitrile Rubber Grades

THE Los Angeles Rubber Group, Inc., held a regular meeting on March 6 at the Hotel Mayfair, Los Angeles, Calif., with some 160 members and guests attending. The meeting included an afternoon technical session, followed by a cocktail hour and dinner. Speaker at the technical session was William A. Fairclough, Nautaguck Chemical Division, United States Rubber Co., who discussed "The Relationship of Specification Trends to the Grades of Nitrile Rubbers."

Mr. Fairclough began his talk by noting that the commercially available grades of nitrile rubber fall into three groups of nitrile contents; near 20%, 30%, and 40%, which may be broadly classed as low, medium, and nitrile rubbers, respectively. Experimental polymers outside this 20-40% nitrile content range appear impractical, particularly for aircraft specifications, because of either poor oil resistance or poor low-temperature resistance.

Oil or gasoline resistance and low-temperature resistance are the most important requirements in specifications covering nitrile rubbers, Mr. Fairclough said. Since these are inverse functions in nitrile polymers, writing or meeting specifications involves some compromise. Liberal quantities of freeze resistant plasticizers were used under former specifications to improve low-temperature flexibility, while apparently also improving gasoline resistance as measured by volume swell. Actually, the plasticizer was extracted. Newer specifications limit shrinkage and, in turn, plasticizer content, making it necessary to use lower nitrile content polymers to obtain desired low-temperature flexibility. With such polymers higher volume swell limits must necessarily be tolerated.

Compounding to meet aromatic gasoline specifications with such a low extraction limit requires a type of "reverse attack," the speaker declared. Since it is axiomatic that freeze resistant plasticizers are almost totally extractable by gasoline or hot oil, the amount of plasticizer which can be used is approximately predetermined by the extraction limit. The amount of type of black is then selected to meet the required durometer hardness, and accelerators and other ingredients are chosen in accordance with requirements for compression set, heat resistance, etc. Lastly, the nitrile grade or blend of grades is practically fixed by the compromise between low-temperature requirements and volume swell limits.

After-dinner speaker was Ralph J. Wade, California Department of Employment, whose topic was "Why Employer Interest in Unemployment Insurance?" Mr. Wade gave a very interesting and instructive talk on the manner in which the California unemployment and disability fund is handled, including statistics on its operation during the past 10 years.

The meeting closed with a drawing for door prizes won by L. D. Snow, Fullerton Mfg. Co.; A. H. Subirn, H. Muehlstein & Co.; J. Cravens, L. J. Tillotson, Rubber-smith of Bakersfield; W. E. Eipper, Oronite Chemical Co.; W. J. Thomas, Firestone Tire & Rubber Co.; K. T. Edwards, Goodyear Tire & Rubber Co.; Mr. Hanke, Lamb Rubber Corp.; Adolph Legman, Don Carr Trucking Co.; and S. P. Atkinson, Kirkhill Rubber Co.

## Rhode Island Club Meets

THE Rhode Island Rubber Club held its spring dinner-meeting on April 6 at the Metacomet Golf Club, East Providence, with approximately 130 members and guests in attendance. Speaker of the evening was Prof. Charles E. Smiley, Brown University, whose topic was "Over the Top of the World." Using color slides to illustrate his talk, Dr. Smiley discussed his trips to Point Barrow, Alaska, and the North Pole in order to gather data on the refraction of light by earth's atmosphere.

## Determination of Moisture in Rubber

**A**N IMPROVED apparatus for precise determination of moisture in rubber has been developed by Max Tryon, of the National Bureau of Standards. The apparatus should also be of value as a rapid, simple means of accurately determining water content in leathers, textiles, oils, dried foods, and other organic materials. The method involves the formation of a minimum boiling azeotrope of an immiscible organic liquid with the water present in the material, distillation of the azeotrope, and separation of the water as a separate phase for volumetric determination. Decomposition of the sample is prevented by the relatively low temperature at which the distillation takes place.

Results obtained with this apparatus at the Bureau on samples containing about 1% water have been of the same order of accuracy as those obtainable with the Karl Fischer technique. It has been found that the procedure, when applied to rubber, is characterized by a standard deviation of 0.023%. For accurate work, allowance must be made for incomplete recovery of all the water in the sample. In the case of rubber, the recovery is about 96%. The method has been accepted by the Office of Rubber Reserve as the standard for determining moisture in all types of synthetic rubber.

<sup>1</sup>"An Improved Apparatus for Determining Moisture in Rubber by Distillation with Toluene," *J. Research NBS*, 45, 362 (1950), RP-2146.

## Discuss Nitrile Rubber

**A**TALK by C. G. Cashion, Nylos Rubber Co., entitled "Why Use Nitrile Rubber," featured the April 10 dinner-meeting of the Buffalo Rubber Group. Some 30 members and guests were present at the meeting which included a cocktail hour and dinner and was held at the Hotel Westbrook, Buffalo, N. Y. Following the dinner, Robert Quirk, Buffalo Police Laboratory, spoke on "Scientific Aids in Modern Criminal Investigation."

Using slides to illustrate his talk, Mr. Cashion discussed both military and peacetime applications for the nitrile rubber, showing how these applications are based on the rubber's low swell in oils, resistance to hot oils, resistance to high and low temperatures, high abrasion resistance, and resistance to many chemicals that normally affect other types of rubbers. Some of the applications discussed were hydraulic fittings for airplane landing gears, naval ships, and automotive vehicles. The speaker pointed out that the hydraulic or fluid drive used in automobiles was made possible by nitrile rubber. Brief mention was also made of the use of nitrile rubber for blending with other elastomers and vinyl resins.

## New Akron Group Officers

**A**PPROXIMATELY 450 members and guests attended the spring meeting of the Akron Rubber Group, held on April 6 at the Mayflower Hotel, Akron, O. Speaker of the evening was Fred E. Ayer, University of Akron, whose subject was

"1951 Model—35,000,000 Jackass Power Rating." The title of Dr. Ayer's talk referred to the 35,000,000 eligible voters who failed to go to the polls in the last national election.

In the business session preceding the talk, announcement was made of the election of the following Group officers for 1951-1952: chairman, Dale F. Behney, Harwick Standard Chemical Co.; vice chairman, Lawrence M. Baker, General Tire & Rubber Co.; secretary, K. J. Kennedy, B. F. Goodrich Co.; and treasurer, V. L. Petersen, Goodyear Tire & Rubber Co.

The Group's annual summer golf outing has been scheduled tentatively for June 15 at the Firestone Country Club, with F. A. Bonstedt, Sid Richardson Carbon Co., chairman of the arrangements committee.

The paid membership of the Akron Group was announced at 1,098 as of April 6, an increase of 169 over the previous count on February 2.

## New Pigment Powders

**T**HE development of a series of tested dispersed organic pigments for use in the coloring of vinyl film and sheeting has been announced by Vansul & Co., Englewood, N. J. Available in the form of free flowing, non-dusting powders, these pigment dispersions are designed for use in the preblending and dry blending coloring techniques. A ready-mix with dry vinyl resin may be made prior to fluxing, with resultant rapid and complete dispersion of pigment in resin after fluxing.

An exclusive colloidal process is said to give not only a uniform color particle size, but to develop a maximum color strength often 25% greater than that of conventional pigments of the same color content. Production runs of compounds containing a color concentration of 50%, the balance being vinyl resin and dioctyl phthalate, have shown these pigments to be superior to regular dry colors in efficiency and end-use quality, it is also claimed. Samples and technical data can be obtained from the company upon request.

## Additional Experimental GR-S Polymers and Latices

**T**HE table below gives the additions and changes in the list of experimental GR-S polymers and latices which were authorized by the Office of Rubber Reserve, RFC, during the period from December 11, 1950 to March 23, 1951.

Normally, experimental polymers will be produced only at the request of the consumers, and 20 bales (one bale weighs approximately 75 pounds) of the original run will be set aside, if possible, for distribution to other interested companies for their evaluation. The 20 bales, when available, will be distributed in quantities of one bale or two bales upon request to the Sales Division of Rubber Reserve, or will be held for six months after the experimental polymer was produced, unless otherwise consigned before that time. Subsequent production runs will be made if sufficient requests are received.

These new polymers are experimental

only, and the Office of Rubber Reserve does not make any representations or warranties of any kind, expressed or implied, as to the specifications or properties of such experimental polymers, or the results to be obtained from their use.

X-NUMBER DESIGNATION	POLYMER DESCRIPTION
Changes in Previously Announced Polymers	
X-577 GR-S	Activated with cumene hydroperoxide, diisopropylbenzene hydroperoxide, Diox 7, or mixtures. Mooney viscosity, 52±6.
X-592 GR-S	Activated with cumene hydroperoxide or diisopropylbenzene hydroperoxide; shortstopped with sodium or potassium dimethyl dithiocarbamate; stabilized with 1.25% Stalite.
New Polymers and Latices	
X-610 GR-S	Same as X-577 GR-S, except shortstopped with sodium dimethyl dithiocarbamate and sulfur. Mooney viscosity, 52±7. Stabilized with 1.25% Stalite.
X-611 GR-S	Butadiene/styrene charge ratio 75/25 adjusted to give 20±1% bound styrene on the finished polymer. Activated with cumene hydroperoxide, diisopropylbenzene hydroperoxide, Diox 7, or mixtures. Polymerized at 41° F. Emulsified with Dresinate 214; shortstopped with DNCB. Mooney viscosity, 52±6. Stabilized with 1.25% PBNA or BLE.
X-612 GR-S	Same as X-577 GR-S, except emulsified with Dresinate 731; Mooney viscosity, 52±6; stabilized with 1.25% Stalite.
X-613 GR-S	Same as X-577 GR-S, except emulsified with potassium Nilox.
X-614 GR-S	Same as X-577 GR-S, except activated with paramenthane hydroperoxide and emulsified with Dresinate 731.
X-615 GR-S Latex	Same as Type V GR-S latex, except butadiene-styrene charge ratio is 50/50.
X-616 GR-S	A mixture of 50±2 parts of high abrasion furnace black, Statex R, and 100 parts GR-S-type polymer polymerized at 41° F. Sodium lignin sulfonate, Dresinate 214, and lignin used in carbon black slurry make-up. Butadiene/styrene charge ratio, 71.5/28.5; activated with cumene hydroperoxide, diisopropylbenzene hydroperoxide, or mixture of both. Emulsified with Dresinate 214 and K-ORR soap; shortstopped with DNCB. Shortstopped Mooney viscosity, 36±5 (ML-4 at 212° F.); stabilized with 1.5% PBNA.
X-617 GR-S Latex	Same as the latex from which X-565 GR-S is coagulated, except Mooney viscosity on the contained polymer is 80-90 (ML-4), and pH is 10.0-11.0.
X-618 GR-S	Same as X-611 GR-S, except polymerized at 47-50° F.
X-619 GR-S Latex	Same as X-547 GR-S Latex, except Mooney viscosity of contained polymer is 160±10 (ML-4). Concentrated to 60% minimum solids.
X-620 GR-S	Butadiene/styrene charge ratio, 71/29; activated with cumene hydroperoxide or diisopropylbenzene hydroperoxide; polymerized at 41° F. Emulsified with K-ORR soap; shortstopped with sodium or potassium dimethyl dithiocarbamate. Mooney viscosity, 55±7 (ML-4); stabilized with 1.5% ELGI; glue-acid coagulation.
X-621 GR-S Latex	Polybutadiene latex polymerized by the Type V latex technique; shortstopped with tetramethylthiuram disulfide. Minimum solids content, 50%.
X-622 GR-S	A mixture of 50 parts Sterling SO black and 100 parts of the same GR-S-type polymer as used in GR-S Black 3; stabilized with 1.5% Stalite.
X-623 GR-S	Same as GR-S-100, except polymerized to higher conversion.
X-624 GR-S	GR-S-100 produced under carefully controlled conditions. To be used as standard polymer for tire tests.
X-625 GR-S	Butadiene/styrene charge ratio 75/25 adjusted to give 20±1% bound styrene on the finished polymer; activated with cumene hydroperoxide, diisopropylbenzene hydroperoxide, or mixtures of both; polymerized at 41° F. in an iron-pyrophosphate sugar-free recipe. Emulsified with Dresinate 214 and Na-ORR soap; shortstopped with sodium dimethyl dithiocarbamate and tetraethylene pentamine. Mooney viscosity, 52±6 (ML-4). Stabilized with 1.25% Wingstay-S.

(Continued on page 248)

# NEWS of the MONTH

## Senate Small Business Hearings May Alter Rubber Program; Symington to Coordinate Rubber in RFC?

Four weeks of hearings before the Senate Small Business Subcommittee on rubber, during which 50 industry and government witnesses praised or criticized the present rubber program, seem likely to result in somewhat more rubber for essential civilian goods and less acceleration in natural rubber stockpile accumulation. The third report of the Senate Armed Services subcommittee scheduled for early May will have some further comment on these matters, and action by the government agencies involved may take place on these matters at about the same time.

May allocations of rubber will permit an increase of some 8,000 tons in civilian consumption to a total of 97,100 tons, or 100% of the adjusted base period. A specified list of products, including passenger-car tires and tubes, will be prohibited from rising beyond the 90% of base-level period authorized in April.

W. Stuart Symington, who was made head of the Reconstruction Finance Corporation, effective April 30, may assume some additional responsibilities in the rubber program. President Truman, in a not too clearly worded statement, has suggested that Symington take over rubber purchasing and operations under the RFC.

The International Study Group meeting in Rome, Italy, during April appears deadlocked on the issue of international allocations of rubber. A long-term, fixed-price agreement between the United States and producer nations on natural rubber does not appear possible. The suggestion that this country agree to international allocation of its synthetic rubber production was rejected.

Price ceilings on tires, tire repair materials, and mechanical goods were awaiting the issuance of the General Manufacturers Ceiling Price Regulation during the last week of April.

Bulletins on technically classified natural rubber have been distributed by the International Rubber Research Board, London, England.

A new contract between The Goodyear Tire & Rubber Co. and the United Rubber Workers of America, CIO, signed March 30, provides for a full union shop for all the company's plants, if approved by the local plant union. A meeting of the international policy committee of the URWA to "determine economic goals for the union for 1951 and to meet the problems presented by mobilization" was scheduled for April 30 and May 1, in Detroit, Mich.

### Washington Report

By

ARTHUR J. KRAFT

### Small Business Committee Hearings

The nation's rubber preparedness program came in for its first thorough public review in four weeks of Congressional hear-

ings which began March 29. All told, some 50 witnesses took the stand in defense or criticism of the measures over the past six months.

The hearings were held by a special subcommittee of the Senate Select Committee on Small Business to investigate the complaints of a number of smaller rubber companies that they were not getting a fair share of the available civilian rubber from the National Production Authority.

While covering this subject in detail, the sessions also probed into varied, but related, aspects of rubber preparedness as stockpiling goals, synthetic rubber production, government pricing of natural rubber, the shortage of truck tires, lack of coordination in government planning and operation, small business participation in the operation of synthetic rubber facilities, etc.

The subcommittee, mindful that basic rubber policy falls under the jurisdiction of the Senate Armed Services Committee, declared repeatedly that its interest was confined to the allocation of that rubber reserved for civilian products. Nevertheless the hearings ranged beyond this field from the start.

Industry leaders who have for months earnestly sought a sympathetic ear for their complaints on the basic direction of rubber policy from someone in government in a position to make policy saw the opportunity for such a forum in the hearings of the Senate subcommittee and made the most of it. Only time will tell whether or not their shots reached the target.

The subcommittee started the hearings with the clear impression, if not the conviction, that the NPA was willfully favoring the industry's Big Four by, first, allocating on the basis of usage in the past period when these companies fared better than others, and, second, by virtually closing the door to appeals from other companies for upward adjustments to correct the government-created or government-fixed pattern of inequitable treatment.

Pending the subcommittee's official report, it is probably safe to state that it was at least partially disabused of this impression by the testimony of the Big Four and some others and by government witnesses. By citing facts and figures, these witnesses hammered home the central point that the problem basically was one of not enough total rubber made available for civilian goods, rather than a simple matter of maldistribution of ample supply. All the major companies argued that they were the victims of whatever maldistribution existed. They had not received the rubber due them.

Judging from its only concrete actions to date, the subcommittee apparently will leave the resolution of the basic issues to others and seek only measures to assure that maldistribution is held to a minimum. On March 30, Chairman Guy M. Gillette (D., Ia.) appealed to the Secretary of Commerce and the NPA to hold off a proposed reduction in April allocations and create a 10,000-ton pool of rubber for apportionment to companies other than

the Big Four. On April 12, Gillette appointed a 21-man committee, 20 of them witnesses before the subcommittee, to act as a "watchdog" over the operation of the NPA's Rubber Division and report from time to time to the subcommittee.

Chairman of this "watchdog" committee is Donald F. Pratt, of Durkee-Atwood Co., and vice chairman is Furber Marshall, of Carlisle Corp. Other members are: Irving Eisbrough, Dayton Rubber Co.; Harry McCreary, McCreary Tire & Rubber Co.; J. F. McCann, Dunlop Tire & Rubber Co.; Vincent Catozella, O'Sullivan Rubber Co.; Thomas Murray, Voit Rubber Co.; Miles Smith, Carolina Rubber Hose Co.; Norman Johnson, Griffith Rubber Mills; W. O. Dismuke, Dismuke Tire & Rubber Co.; Pierce Sperry, Sperry Rubber & Plastics Co.; Raymond Thornburg, Pawling Rubber Co.; Lloyd Monroe, Hawkeye Rubber Co.; George Toney, American Wringer Co.; Newton D. Baker III, Harris Products; G. C. Waldrop, Grand Prairie Rubber Co.; J. B. Clift, Pretty Products, Inc.; Milton Seidenman, Monarch Rubber Co.; A. H. Smith, Kerite Co.; Arthur Nolan, Latex & Rubber, Inc.; and W. W. Marsh, National Association of Independent Tire Dealers.

As of the last week of April, NPA was uncertain as to precisely what action the subcommittee intended to take with regard to the "watchdog" group of small rubber company representatives. Since it seemed unlikely that the Rubber Division would find it administratively feasible to consult with this group on each contemplated action, two members of the group Chairman D. F. Pratt and Thomas Murray, were appointed to the formal Rubber Industry Advisory Committee, making a total of 30 members. Several members of the "watchdog" committee already hold membership (or at least their companies are represented by other executives) on the regular NPA Advisory Committee.

In this connection, several observers at the hearings felt that the bitter attack leveled at the allocation program by some witnesses for small rubber companies stemmed, in large measure, from inadequate understanding of the full picture on rubber availability. There are indications that the NPA is now alive to the need of fuller explanations of the reasons why it must take various conservation measures. The agency's press releases, on which many consumers of rubber must rely in good measure, reflect this change.

A summary of the testimony and the actions it influenced follows. One phase, the expansion of synthetic rubber production, is treated more fully elsewhere in this report.

The major companies in the industry came on in the second week of the hearings with an argument derived from the 44-page "Bluebook" presented by the tire segment of The Rubber Manufacturers Association, Inc., to the NPA and other agencies last October.

They maintained that the stockpile is now adequate, estimating it at somewhat over 650,000 tons, to meet all essential requirements for an all-out four-year war.

The rate of stockpiling can be sharply reduced, it was said. John L. Collyer, president, The B. F. Goodrich Co., called for an immediate moratorium, pending an analysis of the industry position and a re-evaluation of the rubber preparedness program.

Other considerations are equally important as developing a war stockpile, the argument continues. The industry must be maintained in a healthy state at all times to keep it in instant readiness to take on war production. There can be no diminution of production activity resulting in the loss of workers, the creation of a backlog of product shortages, including auto and truck tires, which could not be made up when industry is required to turn to all-out war production.

What is happening now under the current great emphasis on stockpiling, the industry argued, is that the rubber industry's production of essential civilian goods is being held to about 90% of last year's rate; while transportation and other essential industries it must service are encouraged to produce at a rate approximately 25% greater than that permitted the rubber products industries.

Shortage of products, therefore, is imminent. Inventories of tires are virtually depleted at all levels. Passenger-car tires will be in short supply this summer. Heavy-duty truck tires already are in such short supply that trucks equipped to take a twin-head tire are carrying heavy loads on a single tire, and trucks coming off production lines today have no tires to move on.

The industry's solution is the rapid removal of restrictions on consumption of rubber (except NPA's end-product specification controls limiting natural rubber content of thousands of products). Translated into statistics, the larger factors of the industry want civilian consumption limited to 100,000 tons a month.

Seiberling Rubber Co. and some others did not go quite so far, although they stood by the basic elements of the industry's argument. The called for a civilian consumption rate of 90,000 tons a month. Seiberling advanced the recommendation that the government name a Rubber Director to coordinate all phases of the program. In other words, this solution suggests that a satisfactory level of civilian consumption can be maintained within the framework of a steadily advancing stockpiling program provided the most is made of the program. All elements of the industry agreed that synthetic rubber capacity should be expanded 100,000 to 200,000 tons a year.

The industry on April 3 had an 80-minute conference with Defense Production Administrator Harrison at which it presented its analysis of the rubber situation and asked for the appointment of a rubber coordinator. Harrison was reported impressed by the industry's critique on the present drift of the preparedness program, but made no commitment on appointment of a rubber "czar." It appeared that the meeting, attended by 16 industry leaders, most of them members of the RMA National Security Policy committee, would result in giving the NPA Rubber Director, Leland Spencer, a freer hand in meeting industry's rubber requirements so as to vitiate the chances of severe shortages of essential products. Spencer sees the problem in the same light as the industry. His policy is likely to seek more flexibility in allocations, with a somewhat looser rein on the natural rubber supply. If Spen-

cer cannot improve conditions, Harrison will be ready to give serious consideration to the more drastic steps proposed by the industry leaders.

The basic elements of the industry's argument were challenged directly by Jess Larson, Administrator of General Services, in an angry statement to the Gillette subcommittee on April 12. Larson charged that industry men who claim that the stockpiling program is unrealistic are talking through a collective hat. The "best minds in America," he said, "developed the stockpiling program, and it is a minimum program, at that."

Nevertheless, Larson declared, there is hope that the day is not too far away when he can inform the American people that the stockpile objective has been met. It was this latter statement that aroused most interest among rubber men. A check of other stockpiling officials, however, found very little justification for the Larson position.

Larson, in his broadside, covered most of the points raised before the subcommittee. He had strong opinions on allocations (they discriminate against the small companies, favor the Big Four), synthetic rubber capacity (it should be enlarged to 1,000,000 tons), the price of natural rubber (we should stop using this material as soon as technology permits; meanwhile, we should drive its price down by expanding synthetic rubber output and require maximum consumption of synthetic; the more synthetic we have the less natural we need to stockpile); the government is not responsible for the current high price of natural rubber; American industry and other western nations who are stockpiling should carry the responsibility, since they had pushed up the price by competing for limited supplies, willingly paid premium prices that GSA refused to pay).

These were the arguments ranged for and against the current preparedness policy. Gillette and his fellow subcommittee members helped seek them out. Gillette expressed his conviction that the problem is one basically of rubber availability, not maldistribution of civilian rubber supplies. He particularly stressed the importance of getting ahead with synthetic rubber production.

The voice of Congress on these matters, as recognized by the Small Business subcommittee, is the Armed Services Preparedness subcommittee of Lyndon Johnson. This group reported that by early May it would have its third report on the rubber situation. It seems likely that the Preparedness group will have something to say about those industry witnesses who divulged, in the name of estimates derived from published figures and industry experience, the current state of the stockpile and the ultimate stockpile objective. Whether the Preparedness subcommittee will take its criticism further, or whether it will join industry's plea for a reevaluation of the preparedness program is the big question.

The major business of the Gillette subcommittee, and a subject to which most of the industry and government testimony was addressed, was that of the NPA allocation program.

Almost all the company witnesses, save those representing the original equipment tire manufacturers, supported the chief contention of the Subcommittee's counsel, Charles Shaver, that the base-period year selected for rubber by NPA (July 1, 1949, through June 30, 1950) favored the Big Four and discriminated unfairly

against all other rubber consumers. They held that this period saw original equipment business at a record high; while other segments of the industry (including other tire firms) were experiencing less prosperous business. It was alleged by some, and later supported by Earl W. Glen, the rubber administrator at that time, that the industry committee consulted at the start of tighter controls last August 25 agreed to this base period on the condition that a liberal policy be followed in granting individual company adjustments.

Again with the support of many small companies, Shaver charged that NPA was creating a "bonus" of some 10,000 tons for the large original equipment suppliers by maintaining allocations on a strict historical basis which no longer reflects actual consumption needs with the original equipment market cut back by materials shortages. A number of witnesses charged that this "bonus" and their own sharply sliced allocations in March have led to wide-scale pirating of their customers by the Big Four. This charge was countered by Spencer's recitation of actual company allocation figures and statements by the Big Four that their actual consumption failed to measure up to the quantities to which they were entitled by NPA monthly allotments.

Spencer, who made four appearances before the subcommittee (including several in executive session) conceded that in several cases his division had unwillingly brought hardship upon some companies. His prepared statement of April 4 answered the complaints laid before the Senators by the industry witnesses.

The base period was selected because NPA was convinced it would require few adjustments. Contrary to expectation, a large number of applications for adjustment were filed. Some 1,500 applications were filed in the five months since August, and almost all were granted, Spencer declared. All but eight of the 87 largest firms and all of the 15 largest received from one to 16 increases. The base was progressively inflated beyond available supply, "lost all semblance of reality," and had increased by mid-January (when Spencer succeeded Glen) by almost a third.

The adjustments followed no consistent pattern, Spencer said, and an analysis of them "completely refutes the suggestion that any one criterion . . . was the guiding principle." It is not true that smaller companies as a group were given preferential treatment, or that they were treated with uniform fairness within their group. Some of the companies who complained of cutbacks of 50% and more in March from previous months had received adjustment in earlier months that increased their authorized consumption by 400 to over 1,000% of actual base-period use. A 50% cutback applied to the 1,000% increase left the company with 400% of base-period consumption.

This, in summary, was the situation Spencer said he found when he took on the job of revising the adjustment base downward from 1,430,000 tons and re-determining each company's new base. As to the effect of this redetermination, particularly as applied to small business, Spencer gave this answer:

Except for Goodrich which had a prolonged strike in the base period, none of the Big Four received adjustments. The 26 other large companies received favorable adjustments, as did the 194 firms in the "small and medium" group consuming more than 100,000 pounds a month. The

<sup>1</sup>INDIA RUBBER WORLD, Nov. 1950, p. 210.

377 "very small" consumers (42% of the total companies) whose annual consumption is under 100,000 pounds were permitted to consume up to this amount regardless of their use in the base period. Rubber Reserve has eliminated red tape in getting supplies of synthetic rubber to these small companies. The 255 "small and medium" companies who had no adjustments before March benefited by having their permitted consumption raised from 76 to 95% of the base on March 1.

Spencer attributed problems in getting delivery of synthetic rubber to Rubber Reserve's low inventory. If the promised 22% increase in supplies is realized this summer by the Goodyear development (and, perhaps, the yet undisclosed General Tire process), NPA plans to let Rubber Reserve rebuild its inventory to a working minimum so that it can render prompt service. As for its treatment of small business, Spencer declared, "Our actions have been definitely favorable to small business." The problem is basically one of insufficient availability of rubber to business.

### April, May Allocations

The April amendment to M-2, as set before the Rubber Industry Advisory Committee on March 30, proposed a reduction in civilian usage to 81,000 tons, about one-third less than the industry is geared to consume. This slash was not put into effect because NPA was able to make GSA assure an extra 5,000 tons of natural rubber for consumption in April. The April order reduced consumption to 90% of the base period and meant a cut-back from March of only 1,500 tons to a total of 89,100 tons of both dry rubber and latex.

The April order also made some basic changes and innovations. The fifth tire for passenger-car original equipment was banned. According to NPA, rubber saved by this measure would have to be put into heavy truck, farm tractor, and other farm equipment tires. Since these truck tires use mostly natural rubber, the manufacturers would be permitted to trade in synthetic for natural.

The allocation of natural latex was reduced from 114% in March to 100% of the base period, or about 5,400 tons. The separate percentage limitation on use of dry natural rubber was lifted, and consumption of natural will be regulated solely by the specifications of Appendix A of M-2, effective March 15. Consumers who could not use all the rubber to which they were entitled under the total new rubber allotment because of specifications on end-product rubber content were permitted to substitute natural for synthetic rubber.

Manufacturers were ordered not to honor "DO-97" priority rated orders (those for maintenance, repair, and operating supplies) for tires, tubes, and other rubber transportation items. At the same time NPA promised to make up part of the rubber used to honor "DO-97" orders for the mechanical rubber goods listed in Codes 9-24 of Appendix A. This rubber would be replaced only to the extent that orders exceeded in volume the manufacturer's shipments of the same items during the base period and would be made up by NPA in the following month's allotment.

The April order also limited tire and tube inventories to a minimum 15-day supply for manufacturers and a minimum 30-day supply for other distributors. NPA also expressed plans for "administrative arrangements" to make more rubber avail-

able to firms manufacturing only camel-back. NPA estimated that in addition to the 89,100 tons of new rubber for civilian use (including 30,000 tons of dry natural), military orders would take some 13,000 tons in April, giving a total new rubber use of some 102,100 tons.

The allocation program for May, reviewed with the industry committee on April 23, shapes up as follows:

Civilian consumption will be increased some 8,000 tons to a total of 97,100 tons by increasing the permitted level of consumption to 100% of the adjusted base period. Only a specified list of products (including passenger-car tires and tubes, bicycle and motorcycle tires and tubes, garden hose, automotive equipment, household and appliance products, mats, athletic goods, sponge rubber products, toys, flooring, latex foam products, etc.) would be prohibited from rising beyond the 90% of base-period level authorized in April. This order, in effect, would permit the manufacture of some essential items to rise above 100%.

The May amendment to M-2 would rescind the April provision granting extra rubber for "DO-97" orders, and these would have to be filled with rubber provided by the regular civilian use quota. The flat ban on resale of synthetic was eased to permit transfer to a sub-contractor, provided the original contractor retains title to the rubber.

NPA proposed dropping the ban on importation of rubber goods containing more natural rubber than authorized by the end-product specifications because it was difficult to administer, had resulted in cutting off imports from some countries who lack synthetic rubber, and was objected to by the State Department and the ECA. Industry objected to dropping this ban, but there was some indication that industry would like NPA to retain, but not enforce the ban as long as no one was permitted to advertise the higher natural rubber content of his imported product.

NPA held off its plan to institute a separate allocation program on cold rubber GR-S. Industry men pointed out that while they want to encourage Rubber Reserve to concentrate on cold rubber production, some companies are not yet equipped to use it.

Spencer painted a brighter picture of future civilian rubber consumption at the April 23 meeting than he had done at the Gillette subcommittee meeting earlier in April. He saw a steady increase in such consumption, made possible by increased synthetic output, as well as increased military goods consumption and stockpiling accumulation of crude.

A second-quarter consumption of 267,100 tons of dry rubber for civilian use and 47,900 tons for military use was forecast by Spencer. Natural latex consumption was estimated at 16,100 tons for civilian use and 1,500 tons for military orders. This compares with a first quarter consumptions of 252,900 tons dry natural (civilian) and 28,500 tons (military); 16,100 tons latex (civilian) and 600 tons (military).

### RFC Reorganization and Rubber

President Truman last month named W. Stuart Symington administrator of the RFC. The appointment was made a few days after Congress failed to block the President's plan to replace RFC's five-man board of directors with a single administrator. The plan was scheduled to go into effect on April 30.

Symington's appointment is expected to

result in greater top echelon interest in the synthetic operation of the Office of Rubber Reserve. The five-man board of directors, headed by W. Elmer Harber since last fall, took little active interest in Rubber Reserve's program. It left these matters largely up to G. C. Oberfell, RFC's production director, and ORR officers.

As chairman of the National Security Resources Board, a post he now relinquishes, Symington was instrumental in getting the White House to order a speed-up in the rubber mobilization program. He issued the directives to bring about large-scale reactivation of synthetic rubber facilities. In September, Symington obtained the President's approval of the rubber preparedness program under which the various government agencies now operate. He adopted the mantle of rubber coordinator. After creation of new defense mobilization agencies, NSRB was relegated to a strictly planning role, and much of its personnel was transferred to the DPA.

Symington will take office (assuming his nomination is approved by the Senate) at a time when Rubber Reserve is approaching the synthetic rubber production goals set last fall by Symington's directives. The agency at this time also is moving rapidly on another of the steps sets forth in the rubber program announced by Symington last fall, planning for expansion of existing synthetic rubber capacity.

This point was brought out by Harber in testimony before the Senate Small Business Sub-committee on April 16. He told the Senators that:

"Studies have been completed which indicate that it would be possible to expand the capacity of the existing synthetic rubber facilities by approximately 100,000 long tons per year by effecting process changes and by the modification and addition of equipment. Detailed plans are now being made for carrying out this expansion program. Concurrently, preliminary plans are being made for the construction of new facilities for synthetic rubber production. This action has been taken in order that we will be in a position to proceed with a minimum of delay, to effect increases in production of synthetic rubber in virtually any quantity, should we be directed to do so. It is estimated that it would require up to approximately one year to effect the expansion of existing facilities and about 18 months, from the letting of contracts, to construct completely new plants, assuming priority assistance is provided."

RFC officials declined to disclose how near they are to putting their plans into action. A team of Rubber Reserve officials, at the behest of the Munitions Board, visited the synthetic rubber installations in late March and early April to gather data for determining how to achieve increased production from the present plants.

Rubber industry advisers to the Munitions Board had urged expansion of production capacity in mid-March and have since publicly advocated both expansion of existing facilities and, in some cases, construction of new plants. This position was endorsed also by Jess Larson in testimony before the Small Business Subcommittee on April 12.

One of the arguments raised against expansion of synthetic rubber capacity was the fear that at some future time rubber goods manufacturers would curb their use of synthetic and return to large-scale use of natural rubber, particularly if the price of the latter drops sharply.

It has been suggested, on the other hand, that a large export market awaits any surplus synthetic rubber this country might

produce. Larson suggested as a "personal" thought on the matter, that "the Government should, by law, require the continued use of synthetic rubber until such time as the industry can become permanently independent of Far Eastern crude rubber sources and government ownership (of synthetic rubber facilities)."

In the same statement before the Small Business Subcommittee, Larson said that Munitions Board Chairman John D. Small had recommended a "substantial increase" in synthetic rubber output.

Larson, speaking for himself, declared, "It is absolutely necessary to increase our synthetic rubber capacity to the equivalent of 1,000,000 tons per year."

Larson believes our policy should set its sights on continuing the improvement in synthetic rubber technology "to the point where we have no dependence upon the Far Eastern market and its capricious price activity"—in other words, he is looking to the day when synthetic rubber completely, or nearly completely, replaces natural rubber in this country.

At this latter point, at least, Larson is stating his own and not the government's proclaimed policy.

The President, in his letter of April 17 asking Symington to take on the RFC job, took Washington rubber officials by complete surprise in mentioning rubber purchases and other operations, now being handled by the GSA, when he said, "It is my desire that insofar as possible rubber purchases and operations also be consolidated under the RFC."

Such coordination of the rubber program that exists today comes from the President's assistant, John Steelman, and the Defense Production Administration of Gen. W. H. Harrison, the coordinating arm of Charles Wilson's ODM.

Officials of these agencies were most emphatic that they know of nothing in the works on consolidating their rubber units under RFC.

Several theories were advanced on what interpretation should be placed on the President's statement, all of them predicated on the assumptions that it was placed there for a definite purpose and that Symington requested some such expression of intent from the President.

Initial reaction, based on conjecture, saw three theories to explain the statement:

(1) Symington will become coordinator of the rubber program in entirety, a Bill Jeffers sort of rubber "czar." Backing for this view stems from Symington's aggressive assumption of the reins when a swift build-up in rubber preparedness was dictated by the outbreak of war in Korea last June. By inclination and experience, Symington has the reputation of being an executive who, when faced with a problem, likes to handle it at a top level rather than through a number of lower echelon units. He does not delegate responsibility very far down the line. For a while last Fall, as NSRB chairman, Symington was Washington's "Mr. Rubber" with a *carte-blanc* from the President, also in writing.

(2) When political events assured a reorganization of RFC, several existing agencies were readying for a back-stage scramble to bring Rubber Reserve into their agencies. Small wanted it in the Munitions Board. Larson wanted it under GSA. Both these men are rather forceful and adept in the ways of bureaucracy. The theory is that Symington asked the President to declare his intent as he did in order to check Larson and Small. The status quo ante, therefore, might prevail with Rubber Reserve remaining under RFC.

(3) The President's statement should not be taken literally. He did not mean what he said. The statement on rubber followed immediately on an illusion to RFC activities in tin. Remember he said, "...also be consolidated." The agency buys tin from overseas for allocation to industrial consumers by the NPA. It also operates the nation's only tin smelting plant, a government facility at Texas City, Tex. It would appear then that the President might want RFC to take over crude rubber buying for industry from the GSA, to complete the parallel with the agency's functions in tin.

It is probable that what is intended by the President will not become known until Symington assumes his new post April 30. An interagency meeting of rubber officials took place on April 20 at which this subject may have been reviewed. Main item on the agenda, however, was the NPA rubber program for May.

The resignation, effective April 30, of George C. Oberfell as director of the Office of Production was accepted by RFC's board of directors in mid-April. Dr. Oberfell, who came out of retirement to take the post last December, explained that the board's acceptance was conditioned on his remaining available as a consultant on the rubber, tin, and abaca programs which fell under the office of Production. Dr. Oberfell also stressed that his retirement "had nothing to do" with the administrative changes in RFC top management. He had taken the job on the understanding it would not require full time. It developed into a full-time job, which by Washington standards, is well beyond 40 hours a week. Dr. Oberfell long served as research director of Phillips Petroleum Co.

### Controlled Materials Plan

The NPA announced on April 12 that a Controlled Materials Plan will be put into operation July 1 for defense production and certain defense supporting activities vital to meeting rearmament needs.

Under the plan steel, copper, and aluminum will be allotted directly to producers of a selected list of materials, some of which are products of the rubber industry. Producers will have to file their third-quarter requirements for the three basic metals soon after May 1.

The products for which application for quotas of the basic metals must be filed, according to the tentative list issued by NPA in April, include tires and inner tubes, rubber footwear, and mechanical rubber goods. The list also includes mention of requirements for special industrial machinery, such as for rubber, plastics, chemical, foundry, tobacco, glass, etc.

Users will be notified before May 1 of precisely what must be done to come under the plan and how to go about it. NPA field offices, which will handle much of the administration of the CMP, will have available on May 1 a specific, up-to-date list of the products coming under the plan on July 1.

According to NPA Administrator M. Fleischmann, "CMP will provide a continuation of the orderly flow of materials and production of the things needed... on time and in the right quantities... for defense and defense supporting programs. With CMP, the NPA will tell producers what the government has to have, it will furnish the time table for getting things done, and it will give producers the authority to carry out the program." "This authority is expressed," he added, "in terms of an authorized production schedule to obtain and use controlled materials and a preference rating on other materials and com-

ponents needed to complete the job. The authorization or allotment of steel, copper or aluminum under the CMP is not a hunting license; it is a cashier's check on the known supply."

Fleischmann and the man who will direct CMP, Walter Skuce, explained that NPA hopes to direct the flow of other materials by controlling the use of the three basic metals. Rubber, for instance, would not be put under CMP along with the three metals, but by limiting automobile production through allocation of steel, rubber and other materials would be indirectly controlled.

NPA, of course, will maintain tight control over the use of rubber and other materials, but the pattern of essentiality will be fixed by allocation of the three metals.

NPA will continue to use "DO" priority ratings, at least for a while, but the reason for putting CMP into effect in the third quarter is apparent from the fact that defense orders and other defense production are increasing so rapidly that the "DO" priorities have become almost meaningless with free use.

CMP, at the start, will mean a "single band" priority system. Coming months are expected to see a two- or three-"band" system (different levels of priorities).

NPA Rubber Director L. Spencer told the Rubber Industry Advisory Committee on April 23 that NPA has no plans to bring rubber under CMP. However, he said, the Rubber Division would make a survey of the rubber industry to determine the uses being made of rubber in order to provide data should a plan specifying the end-uses of rubber become necessary.

### Study Group Meeting

First reports from the meeting of the International Rubber Study Group in Rome, during the week of April 16 indicate that efforts to develop an allocation plan for natural rubber made no more headway than during the previous two-week conference held in London during February by the same ten governments. In fact, it is reported that the talks were adjourned with no agreement to resume them at a later date.

The United States delegation, headed by Willis Armstrong of the State Department, again pressed for a short-term agreement to provide adequate supplies of Far Eastern rubber for this government. Representatives of producer nations held out for a longer-term agreement, going beyond the time when the United States expects to complete its stockpile program.

One European, a consumer, but not a producer of crude rubber, proposed that the United States agree to international allocation of its synthetic rubber production. The response was negative.

The Malayan Government's announcement of April 6 of steps to curb the flow of natural rubber to Communist China received no official comment in Washington. Some here reserved opinion until events determine the effectiveness of the Malayan action. In a dispatch from Singapore on April 20, the United Press reported that the Malayan Government on that date authorized export of about 10,000 tons of rubber to Communist China so that traders can fulfill contracts made before April 6.

A curb on shipments of natural rubber to Communist China and Hong Kong was one aim the U. S. delegation brought to the London conference in February.

Also in connection with intergovernmental actions on rubber, the Council of Foreign Ministers of the American Republics, meet-

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ing in Washington in early April, passed a resolution stating their desire that production of both fine Hevea and the soft rubbers be encouraged in the Western Hemisphere. The resolution also favored expansion throughout the hemisphere of rubber goods manufacturing facilities. The Council includes all governments of this hemisphere.

### Guayule Rubber

Improved guayule rubber is now undergoing road tests in tires, Byron T. Shaw, deputy administrator of the Agricultural Research Administration, U. S. Department of Agriculture, told a meeting of the National Farm Chemurgic Council in Cincinnati on April 19.

Speaking on "Defense Needs in the Chemurgic Field," Shaw said that the ARA has "developed a method for removing resins from the crude guayule rubber, and the resulting deresinated rubber compares favorably with imported rubber for the manufacture of tire carcasses."

"We have learned a lot about guayule since the last war," he added. "We have learned how to produce the plants and grow the crop more economically. Through plant breeding, we have learned that the rubber content of the guayule shrub can be greatly increased. We already have strains that produce as much as 50% more rubber per acre. . . . We have increased the yield and quality of guayule rubber by processing the green shrub instead of letting it dry out after harvest. A continuous process developed for extracting the rubber is working well on a small scale."

### Tire Prices

Representatives of the tire manufacturing industry told Office of Price Stabilization officials during April that the old OPA Regulation 143 would provide a satisfactory basis for framing a new ceiling price regulation covering the manufacture of tires and tubes for private-brand owners.

At a meeting held April 18 the manufacturers stressed their desire that a special regulation covering this branch of their business be put into effect by the time the General Manufacturers Ceiling Price Regulation is operating; so they would not have to compute their ceiling prices twice in a relatively short time.

The manufacturers said they want a regulation permitting them to determine ceiling prices through periodic computation of costs to which would be added a fixed percentage markup—the same percentage markup used in the first half, or some period during the first half, of 1950. The regulation would not permit such ceilings to exceed the minimum prices charged for their own comparable brands to their lowest-priced level of distribution, OPS said.

OPS sought the manufacturers' views preparatory to a meeting held the following day with its Private Brand Tires & Tubes Industry Advisory Committee, representing the private-brand owners supplied by the tire manufacturers.

This advisory committee, on April 19, endorsed the manufacturers' proposal for a cost plus fixed percentage markup, as patterned after OPA Regulation 143, but asked the agency to defer discussion of the specific terms of a price ceiling regulation for sales by owners of private brands until the General Manufacturers CPR is issued. Knowledge of possible applicable provisions of the manufacturers' pricing order, they said, is necessary before drafting regulations covering the product at later stages of distribution.

The manufacturers consulted by OPS on April 18 were Merlin H. Loach and K. L. Frost, Cooper Tire & Rubber Co.; Noel Lanham, United States Rubber Co.; Fred Machlin and H. W. Sherlock, Armstrong Rubber Co.; L. D. Hartford, Dunlop; W. E. Archibald, Dayton; Carl B. Gibson, Mansfield Tire & Rubber Co.; and W. C. Behoteguy, B. F. Goodrich Co.

The meeting was convened by Hubert H. Peterson, chief of the Tire Section; Rubber, Chemicals and Drug Division. Other OPS officials present were George Abrams, consultant; Everett D. Hawkins, economist; Alfred Letzler, Division counsel, and Philip Travis, counsel.

Members of the Private Brand Tire & Tube Advisory Committee are John H. Buchanan, Atlas Supply Co.; Alex Flemington, Western Auto Stores; Vernon Lawrence, Star Rubber Co.; Arthur K. Walton, Sears, Roebuck & Co.; Jay R. Isaacson, World Tire Co.; Archibald Koehler, Vogue Rubber Co.; and Wayne W. Letho, National Cooperatives, Inc. All members were at the meeting except Flemington. Peterson, Travis and Abrams attended for OPS.

### Other OPS Meetings

OPS officials held meetings with two newly established rubber industry advisory committees in late March.

On March 27 the 12-member Tire, Tube and Camelback Manufacturers Industry Advisory Committee recommended that discussion of a tailored ceiling price regulation for their products be deferred until OPS issues the general manufacturers regulation. On March 30 the 16-member Mechanical Rubber Goods Industry Advisory Committee began working on recommendations for a special ceiling-price order applying standard percentage adjustments of published price lists prevailing last June.

The committee agreed that satisfactory adjustments could be worked out on a wide list of standard catalog items such as flat belting, V-belts, hose, printers' rollers, sheet packing, and mats, etc. Subcommittees were set up to determine the complete list of items in their respective fields which they feel should be priced in this manner, possibly including some items not on standard price lists, OPS officials said.

The plan presented would involve taking prices prevailing last June on certain key items, add subsequent direct cost increases, and compute weighted averages which then could be translated into percentage factors. Ceiling prices then would be computed by each manufacturer by multiplying his price of last June by the appropriate factors.

Subcommittee chairmen agreed to advise OPS what typical items should be used in making the computations and to furnish lists of manufacturers to be polled for data for OPS economists. They agreed also to consider what practical formula might be applied to bid price goods. The industry group and OPS officials agreed that no specific recommendations would be made before the general manufacturers regulation is issued. This regulation was expected in late April. Hugo Weisberger is chief economist for the Rubber, Chemicals & Drugs Division, and Everett D. Hawkins is chief economist of the Rubber Branch.

Members of the two new committees are: Tire, Tube & Camelback—H. N. Hawkes, U. S. Rubber; H. F. Webster, Denman Rubber Mfg. Co.; James J. Newman, Goodrich; H. D. Tompkins, Firestone Tire & Rubber Co.; Irving Eisbrough; C. C. Gates, Jr., Gates Rubber

Co.; Frederick Machlin, Armstrong Tire & Rubber Co.; Clarence C. Osmun, Goodyear; L. A. McQueen, General Tire & Rubber Co. L. M. Seiberling, Seiberling Rubber; W. J. Frisby, Polson Rubber Co.; and Howard Cope, Cascade Rubber Co.

Mechanical Rubber Goods—E. F. Tomlinson, Goodrich; D. W. Meher, Minnesota Mining & Mfg. Co.; E. M. Ikirt, Republic Rubber Division, Lee Rubber & Tire Corp.; L. L. Carroll, Gates; W. J. Blizzard, Firestone Industrial Products Co.; E. A. Callahan, Brown Rubber Co.; T. J. Lackner, Accurate Mfg. Co.; H. D. Foster, Goodyear; Howard D. Herbert, Hewitt-Robins, Inc.; W. F. Spoerl, U. S. Rubber; George R. Keltie, American Wringer; L. C. Strobeck, Dayton; Roland Reppert, American Hard Rubber Co.; Harry E. Smith, Raybestos-Manhattan, Inc. H. L. Maxon, Boston Woven Hose & Rubber Co.; and John W. Fisher, Ball Bros. Co., Inc.

In the week beginning April 22, OPS had meetings scheduled with industry committees on waterproof rubber footwear, rubber adhesives, rubber soles and heels, and molded, extruded, and lathe-cut rubber goods.

### Other Industry News

#### Bulletins on Technically Classified Natural Rubber

According to the April, 1951, issue of *Natural Rubber News*, bulletins on technically classified natural rubber are now being distributed to executives and technologists in consuming factories and to buyers and dealers. The bulletins are in two forms, the first called a "News Sheet," is going to executives in consuming factories, buyers, and dealers; and the second, "Users' Information Circular," is going to technologists in users' factories and laboratories.

*News Sheet No. 1* and *Users' Information Circular No. 1* are both found in the above-mentioned issue of *Natural Rubber News*. They are both distributed under the aegis of the International Rubber Research Board, 19 Fenchurch St., London, E.C.3, England.

The *News Sheet* explains in general terms what technically classified natural rubber is and emphasizes that the normal market classification is supplemented by additional information about technical characteristics, obtained from physical tests carried out on the freshly prepared rubber. This additional information is given by special marks on the outside of the bale; a consignment may contain differently marked bales, but all bales bearing the same technical mark will be substantially uniform in technical characteristics.

Commercial quantities of technically classified natural rubber are now being marketed by French producers in Indo-China and Malaya, and apart from consignments from French sources the Rubber Research Institute of Malaya has recently shipped a consignment from British producers in Malaya, which is to be tested by The Rubber Manufacturers Association, Inc.

It is pointed out that by virtue of the additional technical information on the bales, blending of several different consignments of the same market grade should no longer be necessary, but that the grouping together of technically classified rubber, bearing any one class mark, would be an adequate means of assuring uniformity. Other

*Ibid.*, May, 1950, p.176.

advantages to be obtained from the use of technically classified rubber were the reduction in the amount of control testing necessary on incoming lots and the possibility of meeting the demand for rubber of certain technical specifications in larger or smaller amounts when necessary.

It was also emphasized that technically classified rubbers are being introduced in the belief that they will provide improved service to the users, but that full advantages of the scheme cannot be realized without the cooperation of rubber goods manufacturers.

The *User's Information Circular No. 1* devoted much attention to trying to clear up a number of misunderstandings which have arisen about technically classified rubbers.

The fact that the Mooney value of freshly prepared rubber shows a marked increase during the first few months of storage was stressed, and it was stated that rubbers which have been stored cannot be expected to meet the original Mooney specification. Evidence exists, however, that the relative amounts of hardening in the different classes is such that the classification groupings are not disturbed. To classify the rubbers according to the Mooney values they are expected to have after storage is not considered practicable for obvious reasons.

Details of testing for 600% modulus to improve the agreement between tests made with the Schopper ring and the dumbbell test piece are given. Schopper ring tests have been made at 600% elongation since January 1, 1951, so that they will be on a comparable basis with dumbbell test strip tests made in this country at 600%.

The rubber will be marked on the basis of the present RMA specifications, so that the consumer will not be inconvenienced in his purchasing, and the technical class mark is intended only as additional information to give the consignee greater value to the user by indicating bales which, when taken together, form a lot possessing substantially uniform properties.

Among the advantages claimed for technically classified rubbers is that users will now be able to study rubbers having selected physical properties, and it is believed that certain classes may prove to be of special value in particular applications. A commercial demand has long existed for high modulus rubbers, and there should be no great difficulty in suitably modifying estate producing technique to meet such a demand if consumers indicate their particular preferences.

All comments on technical aspects of these new rubbers should be addressed to R. G. Newton, 48 Tewin Rd., Welwyn Garden City, Herts, England.

### "Synthetic Rubber Production Trends"

In an article under the above title in the April issue of *Natural Rubber News*, John T. Cox, Jr., chemical engineer, Washington, D. C., and former deputy director of ORR, discussed the synthetic rubber outlook and provided a production estimate for the year 1951.

Dr. Cox said that in spite of recent difficulties, the government's synthetic rubber plants are now in excellent mechanical shape, with the exception of the alcohol-butadiene unit that must have extensive repairs. Until this plant unit gets back in operation, the full potential of the program cannot be realized.

Capacity for the production of cold rubber will reach a 340,000 ton annual rate by the end of the year.

ESTIMATED U.S.A. SYNTHETIC RUBBER PRODUCTION—1951

Month	GR-S Long Tons	Butyl Long Tons	Nitrile Types Long Tons	Neoprene Pounds
January	48,000	6,277	1,250	10,000,000
February	45,500	5,360	1,000	9,000,000
March	53,500	5,650	1,250	9,500,000
April	54,000	6,100	1,300	11,000,000
May	56,000	6,200	1,250	11,000,000
June	60,000	5,100	1,250	11,000,000
July	64,000	6,800	1,250	11,000,000
August	64,000	6,300	1,250	11,000,000
September	62,000	6,600	1,250	11,000,000
October	64,000	6,800	1,300	13,000,000
November	62,000	6,600	1,300	13,000,000
December	64,000	6,800	1,300	13,000,000
Total	697,000	74,587	14,950	133,500,000

\*Normal turn-around month.

The additional GR-S synthetic rubber production capacity of 200,000 long tons a year being planned by ORR will mean additional polymerization capacity, additional butadiene capacity, and expansion of the styrene program, it was said. Although rumors have also been afloat concerning an expansion of the butyl rubber program, no firm commitments have been released.

Further additions to private polymerization capacity are contemplated by U. S. Rubber at its recently acquired nitrile-type plant in Baton Rouge, La., and by E. I. du Pont de Nemours & Co., Inc., which expects to have additional supplies of carbide coincident with the completion of additional polymerization capacity during the last quarter of 1951.

With regard to the new GR-S extended with 20-25% petroleum plasticizer, Dr. Cox said that some authorities are dubious concerning the merits of this polymer to stretch the rubber supply of this country; while others think that it has great merit as a stop-gap procedure. Up to this moment there has been no clearly defined decision one way or the other.

In the table above Dr. Cox estimates synthetic production in this country for the year 1951. It must be clearly understood, however, that these are estimates and do not take into account fires, weather, explosions, the will of the Lord, or a shooting war, he added.

### General Tire Synthetic

Production of "Polysar Krynol," a new type of synthetic rubber by Polymer Corp. at Sarnia, Ont., Canada, in cooperation with The General Tire & Rubber Co., Akron, O., was announced early in April, and it is stated that the new product is indistinguishable in appearance from ordinary raw rubber and "has the right balance of quality and processability required for commercial utilization."

It was added that test tires containing high percentages of the new rubber, used on a test fleet for the last several months, have covered thousands of miles and have thoroughly proven the product for their use.

John R. Nicholson, Polymer's executive vice president, said it had been working on the new process<sup>3</sup> for more than a year. Originally made on an experimental basis in the company's pilot-plant in Sarnia, it has only been put on a commercial basis in the last couple of months.

The Polymer executive said the synthetic rubber is being manufactured solely for the use of General Tire. Polymer's shipments to the United States are close to 50,000 pounds a month. General Tire will build a factory in Canada to use this Polymer rubber and produce mechanical rubber goods. It was hoped to start construction of the plant this summer although plans are not yet complete.

<sup>3</sup> *Ibid.*, Dec., 1950, p. 333.

<sup>4</sup> *Ibid.*, Mar., 1949, p. 740.

### Belt Railroad Fight

The more than 100-mile belt railroad across the State of Ohio, proposed by H. B. Stewart, Jr., president of the Akron, Canton & Youngstown Railroad, in 1949 was a subject of debate in the State Senate of Ohio during March. Legislative approval to give belt conveyer lines the same rights as public utilities, which was denied when the belt railroad was first proposed, seemed unlikely to be coming this year from the Ohio Legislature.

The rules committee of the State Senate, in a surprise move on March 28, decided that consideration of a bill to provide for the "right of eminent domain" for the belt railroad was to be "indefinitely postponed."

Stewart in a statement early in April said that he intends to continue his fight to get legislative permission to build the \$210,000,000 Ohio River to Lake Erie belt conveyor line. A bill similar to the one rejected by the Ohio Senate rules committee will be introduced into the Ohio House of Representatives.

Also in early April, in Washington, Stewart with the help of some 18 technical men, told the story of the proposed belt railroad to officials from the military and civilian branches of the Federal Government. The presentation was made by virtue of arrangements made with Com. Charles Heck, chief of transportation of the Munitions Board, and was intended to show that by use of rubber conveyer belts, mobilization materials could be moved cheaply about the country.

*Fortune* in its April issue carried a story on conveyer belts in general and the proposed Ohio Riverlake conveyer belt in particular. The Riverlake Engineering Council, composed of Goodyear, Link-Belt Co., Hewitt-Robins, Stephens-Adamson, Chain Belt, Wellman Engineering, Jeffrey Mfg., General Electric Co., Dravo, A. C. & Y. Railroad, and Westinghouse, with Cleveland Electric, Ohio Edison, and Ohio Power, acting as consultants, have spent \$500,000 on research for the proposed belt railroad.

### Labor News

#### Goodyear-Union Agreement

The contract negotiations between Goodyear and the United Rubber Workers of America, which became stalemated in mid-March after having been in progress since January 9, were resumed in Cleveland, O. In view of the stalemate, which was on the matter of a union shop for all the Goodyear plants, the URWA announced plans for taking a strike vote.

On March 30, a new contract running to February 10, 1953, between the company and the union was signed containing an agreement for a full union shop. It was the first full union shop agreement among the Big Four; the other rubber companies in this group have modified union shop agreements.

# EAST

## Consolidating Operations

American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y., has leased a 60,000-square-foot building at 1055 Commonwealth Ave. to house its operations in Boston, Mass. The building, a two-story and basement structure of brick and reinforced concrete, will be completely altered to meet Cyanamid's requirements. The new facilities replace four separate offices and four warehouses formerly used by the firm in Boston.

The main purpose to be achieved is the consolidation of these facilities so that the several divisions of the company may better serve Boston and New England customers. It will enable Cyanamid to meet the varied requirements of all its divisions for office space, laboratories, blending rooms, warehouse facilities, and loading docks.

Among the units of the company which will use the new facilities are Calco Chemical Division's dyestuffs and Pigment departments; the industrial chemicals division; the coating resin department of the plastics and resins division; and Lederle Laboratories Division's branch and northeastern regional sales office.

The consolidation of the Boston operations is part of an overall plan which calls for a similar consolidation of Cyanamid activities in other major cities of the United States and Canada.

### Calco Appointments

Victor E. Wellman has been named director of process engineering department, Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J. In his new capacity Wellman will direct process development and chemical engineering activities which have been merged to form the process engineering department. He was associated with The B. F. Goodrich Co. for 15 years as director of purchases, chemicals division, and later with R. W. Greeff Co. as assistant sales manager, solvents department. In 1945, Dr. Wellman joined Calco and since 1949 has been associate director of process development. He is a member of the American Chemical Society, Amer-



Victor E. Wellman

ican Institute of Chemical Engineers, Society of Chemical Industry, and the Commercial Chemical Development Association, of which he is president-elect.

Francis J. Verduin, Calco pigment department sales representative, has been transferred to the St. Louis territory. Mr. Verduin was first associated with Sherwin-Williams Co. and then in 1942 was assigned to the Illinois Ordnance Works. He returned to Sherwin-Williams in 1944, serving in the Chicago plant's industrial formulation and technical service department. He joined Calco in 1946, where he was in charge of the application laboratories of the company's titanium plants until his appointment in November, 1950, to the pigment sales department.

Leo J. Sobell has been appointed a representative in the New York metropolitan area for Calco's pigment department. He joined the Calco pigment technical service department in 1948 and since 1949 has been with the pigment sales department.

## Taylor Centennial

Taylor Instrument Cos., Rochester 1, N. Y., is celebrating its one hundredth anniversary this year. Started in 1851 as a tiny partnership, Kendall & Taylor, for making household thermometers and barometers, the company has grown to a multi-million-dollar corporation manufacturing some 8,000 variations of its basic products and distributing them all over the world. The largest part of the present Taylor line is the industrial instrument division, which began in 1896 with the purchase of a firm making mercury-in-glass industrial thermometers. In 1905 the first controllers were added to the industrial line and had an important effect in the development of continuous processing systems in this country. Taylor was chosen prime contractor in the development, design, and manufacture of all process control instruments for the gaseous diffusion plant of the Oak Ridge, Tenn., atomic bomb project. In the rubber industry, Taylor controls are used for synthetic rubber reactors, rubber curing presses, and many other machines and operations. The company manufactures instruments to indicate, record, and control temperature, pressure, flow, force, liquid level, and humidity. Branch offices cover the country, and subsidiaries in Canada and England serve other parts of the world.

## News from Goodrich

The B. F. Goodrich Co., Akron, O., has moved its crude rubber inspection office from 19 Rector St., New York, N. Y., to Room 1505, Brady Bldg., 90 West St., New York. C. B. McKeown is manager of the raw materials inspection and development department.

Goodrich shareholders at their annual meeting in New York last month reelected the following directors whose three-year terms had expired: John L. Collyer, Cleveland E. Dodge, Charles S. McCain, R. S. Rauch, and George W. Vaught.

Construction on additional facilities for the company's research center has been started at Brecksville, O. The new construction will include additions to existing buildings and will be ready for occupancy in October.

Before the agreement can become official, union shop elections must be held in five of the Goodyear plants, including Akron. Five other Goodyear plants have already had such elections, and the majority of the members of the bargaining unit have indicated their desire for a full union shop. Also, before the contract will become effective, Goodyear and the union must sign supplemental agreements with the ten local unions covering working conditions peculiar to the respective plants.

Under the new contract all present members of the URWA must retain their membership. Within 30 days after the contract goes into effect, all non-union workers now employed by Goodyear must make application for URWA membership. All new employees are required to join the URWA within 30 days. Non-union employees, whose application for membership in the URWA are rejected, cannot be fired under the Taft-Hartley Act.

Besides the union shop, the new agreement provides a liberalized wage application program; payment of average hourly earnings for temporary transfer and development and experimental work; increased wage payments for holiday work; and the right to terminate the agreement over any issue not subject to arbitration. The union may also reopen the wage question on 30-day notice at any time.

On April 9, with only five dissenting votes, the local Akron URWA union approved the new company-wide contract. The union explained to its members that the clause whereby certain employees would not be able to join the union because the union would not accept their application was written into the contract to bar supervisors, other management people, and people "with certain political affiliations."

On April 13 about 3,300 workers at the Akron Goodyear plant were away from their jobs because of a dispute over wage rates. A contributing cause to the dispute was shortening of working hours brought about by reductions in the amount of crude rubber available for processing. The workers returned to their jobs between April 14 and 17.

### International URWA Meeting

The international policy committee of the URWA meets in Detroit, Mich., April 30 and May 1. The policy group which will determine the economic goals for the union for 1951, is also expected to work out a program "to meet the problems presented by mobilization," according to international union president, L. S. Buckmaster. About 200 delegates representing workers in the rubber, cork, linoleum, and plastics industries are expected to attend.

### Work Stoppages

A wildcat strike at the Mohawk Rubber Co. plant in Akron made 400 workers idle on March 30. Employees protested wage rates on heavy truck tires being made for the Army.

The third walkout in the month of March at the Sun Rubber Co. plant in Barberton, O., took place on March 30 and affected about 1,100 employees. The difficulties were due to dissatisfaction with wage rates in the pressroom.

The U. S. Rubber plant at Fort Wayne, Ind., was out of production for two or three days April 4 through 9 because of a walkout resulting from the dismissal of 18 women workers in the fuel cell department. The company announced that it had filed a \$325,000 damage suit against the union as a result of the walkout.

## Baldwin Expanding Scope

Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa., through President Marvin W. Smith, announced the purchase of the assets of Austin-Western Co., Aurora, Ill., on March 19. The purchase involved the exchange of 303,945 shares of Austin-Western common stock for 486,312 shares of Baldwin-Lima-Hamilton common. Austin-Western is a well-known manufacturer of road building equipment, including road graders, street sweepers, rock crushers, road rollers, hydraulic cranes, and railroad dump cars.

The acquisition of Austin-Western follows the purchase of the Lima-Hamilton Corp. by Baldwin Locomotive Works on December 4, 1950, at which time the company assumed its present name. Baldwin Locomotive manufactures presses, power tools, materials testing equipment, hydraulic turbines, water wheels, diesel engines, and railroad locomotives. With the addition of Lima-Hamilton came the manufacture of cranes, shovels, draglines, mechanical presses, industrial and railroad tools, diesel and gas engines, and sugar milling and can making equipment. The integration of these three companies into the Baldwin-Lima-Hamilton Corp. creates a new industrial structure with plants from coast to coast and products required by all basic industries. Company plants are located at Greenwich, Conn.; Burnham and Eddystone, Pa.; Hamilton, Lima, and Middletown, O.; Aurora and Rochelle, Ill.; and San Francisco and Los Angeles, Calif.

## Raybestos Promotes Two

Election of George W. Marshall, Jr., and Alvin F. Heinsohn as vice presidents of Raybestos-Manhattan, Inc., Passaic, N. J. was announced April 11.

Mr. Marshall, sales manager of the Asbestos Products Division since 1947, will continue to direct sales activities on asbestos brake lining, clutch facings, asbestos textiles, mechanical packings, and powdered metal friction material. His headquarters are at the company's Manheim, Pa., plant.

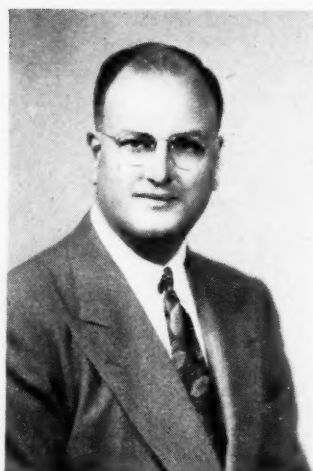
Mr. Heinsohn will be vice president in charge of the company's General Asbestos & Rubber Division at North Charleston, S. C. He has been general manager of the plant since 1944.

Both Mr. Marshall and Mr. Heinsohn are directors of Raybestos-Manhattan.

Other elections announced were W. Ward Kievit, assistant treasurer; William H. White, and Charles J. Geilfuss, assistant secretaries.

Raybestos-Manhattan also recently announced plans to erect a new plant in Crawfordsville, Ind., to be named the Wabash Division of Raybestos-Manhattan, Inc.

J. M. Huber Corp., 100 Park Ave., New York 17, N. Y., has a description of its channel black manufacturing facilities at Borger, Tex., in the February-March issue of its house organ, *Huber News*. The article reviews the history of Huber carbon black manufacture from its inception to date, then describes and illustrates the operations involved in the manufacture of channel black, including testing, inspection, packaging, shipping, and storage.



Ralph B. Appleby

## Du Pont Promotes Appleby

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has promoted Ralph B. Appleby, salesman in the Akron, O., office of the rubber chemicals division, to the post of sales supervisor of that office. His former position goes to Embert L. Stangor, research chemist at the firm's Akron laboratory.

Mr. Appleby, before joining du Pont in 1937, had been in the technical division of The B. F. Goodrich Co. since 1925. He has been a salesman in the Akron office of the rubber chemicals division since 1945.

Mr. Stangor worked as a rubber compounding about five years for Featheredge Rubber Co. and Chicago Belting Co. before starting at du Pont's rubber laboratory at Deepwater Point, N. J., in 1945. More recently he has been in charge of mechanical goods compounding at the Akron laboratory.

Dewey & Almy Chemical Co., Cambridge, Mass., has announced that its rubber specialties division is now manufacturing specialized industrial rubber gloves for the U. S. Air Force and other governmental services, under contract to Miller Products Co., New York, N. Y. The gloves are made from compounds developed in three months' time in the division's research laboratory to meet rigid government specifications. These compounds are highly resistant to acids, alkalis, and other corrosive chemicals. Because of these properties, many other industrial uses are visualized.

Socony-Vacuum Oil Co., Inc., 26 Broadway, New York 4, N. Y., has begun production of a motion picture to show service station operators and attendants how to assist motorists in the care of their tires. Entitled "Save a Tire. Save a Customer," the film is intended to aid and promote tire conservation while encouraging motorists to depend on a single service station for regular tire maintenance and care. The film, expected to be released about May 1, is being photographed at stations in the New York area, with dealers and attendants playing the leading roles.

## Reeves, Salvage Advanced

The Timken Roller Bearing Co., Canton 6, O., has appointed Paul Reeves director of sales and Seward T. Salvage advertising manager, Mr. Reeves' former post.

Mr. Reeves started with Timken in 1929 and after completing the engineering training course served as sales engineer in the Chicago office. He was subsequently transferred to the San Francisco branch office, where he was made industrial district manager and in 1940 was brought back to Canton as Sales Promotion Manager. When this country entered the war, Mr. Reeves was put in charge of government priorities to handle contacts between the company and Washington. He was named advertising manager in 1943.

Mr. Salvage joined Timken in 1933 as a sales trainee and one year later was transferred to the Pittsburgh district office as sales engineer. In 1937 he was moved to the Houston, Tex., office and three years later was appointed district manager at Los Angeles, where he remained until entering the Navy in 1943. After leaving the Navy in 1945 Mr. Salvage served Timken as assistant district manager in the industrial bearing sales office in Cleveland. Transferred to Canton in 1949, he became sales promotion manager.

Norman H. Peterson later was named assistant advertising manager. He joined Timken's advertising department in June 1946, and has been serving as a copywriter.

## O'Sullivan Rubber Elects

O'Sullivan Rubber Corp. stockholders at the annual meeting in Winchester, Va., April 5, elected three new directors to replace retiring members of the Board and re-elected six other directors. Newly elected are Herbert W. Grindal, H. Douglas Weaver, and William H. West, Jr. Directors re-elected were Earl Bunting, C. F. Cassell, V. A. Catozella, R. J. Funkhouser, Paul Terretta, and D. O. Worthington. Retiring directors were R. U. Darby, R. P. Funkhouser, and A. C. Halvosa.

The board at a subsequent meeting elected H. Douglas Weaver, secretary, replacing P. L. Hoekman, who continues as treasurer of the corporation. Other officers elected include R. J. Funkhouser, chairman of the board; V. A. Catozella, president; R. B. Grove, assistant to the president; Paul Terretta, executive vice president; A. C. Halvosa, vice president; W. S. Winterson, vice president and assistant treasurer; Dale A. Dougherty, comptroller; D. O. Grimm, assistant treasurer; and R. S. Beck and O. R. Zigler, assistant secretaries.

The Pyramid Rubber Co., Ravenna, O., last month elected the following officers: chairman of the board, R. W. Askanase; president, C. R. Porthouse; vice president, A. J. Farfel (re-elected); secretary-treasurer, J. B. Barrett, also re-elected.

Mr. Askanase had been company president.

His successor has been with the company since 1937 and previously had been its vice president and factory manager. Mr. Porthouse is also president of Harcourt Mfg. Co. and of Rexware, Inc.

## Eagle-Picher Elections

At the annual shareholders' meeting of The Eagle-Picher Co. held March 27 at company headquarters, 900 American Bldg., Cincinnati 1, O., three new members were elected to the board to succeed Joseph Hummel, Jr., Arthur E. Bendelari, and the late Robert E. Mullane. Mr. Hummel and Mr. Bendelari, both of whom were connected with the company for a number of years, were elected directors emeritus. The three new directors are Stanley R. Miller, Wm. H. Mitchell, and George A. Spiva.

Mr. Miller is a New York partner in the investment banking firm of Goldman, Sachs & Co., an organization closely identified with Eagle-Picher for many years.

Mr. Mitchell has been long associated with the steel industry as president of Mitchell Steel Co. and Ridgewood Ordnance, Inc., and as a director of Armo Steel Corp.

Mr. Spiva comes from Joplin, Mo., in the heart of the Tri-State Mining District of Missouri-Oklahoma-Kansas, and is well known in that area by reason of his family's long residence and broad financial interests in the commerce and industry of the District.

Reelected Eagle-Picher directors for the coming year are: Vincent H. Beckman, Joel M. Bowlby, Carl A. Geist, Carl F. Hertenstein, Elmer Isern, John J. Rowe, T. Spencer Shore, and Miles M. Zoller.

All officers of the company were reelected as follows: Mr. Bowlby, chairman of the board; Mr. Shore, president; Mr. Geist, vice president, secretary and treasurer; Wm. R. Dice, vice president and comptroller; Richard Serviss, assistant secretary.

## Reassign Sales Territories

Emery Industries, Inc., Cincinnati, O., has assigned territory sales responsibilities to two new salesmen, J. A. Funk and Wm. J. Siemens, Jr. Funk will operate out of the home office in Cincinnati and will handle the sale of all chemical products in southern Ohio, southern Indiana, and eastern Kentucky. The western Pennsylvania, West Virginia, and western New York State territory will now be serviced by Siemens, in Pittsburgh.

The above territories were vacated by E. G. Hibarger, now district manager of the newly established Chicago office. Working with him are D. R. Robertson and A. R. McDermott, and all will service the northern Illinois, northern Indiana, Wisconsin, Minnesota, and northern Iowa areas. Robertson will also continue his coverage on all chemical products in Michigan (exclusive of Detroit) and on specialty products in the Detroit and northern Ohio areas.

The products of the chemical sales division are: stearic and oleic acids, animal and vegetable fatty acids, hydrogenated fatty acids, special fatty acids, fatty acid derivatives; plastolein plasticizers; Twitchell textile oils, soluble oil bases; and fat splitting reagents.

Sharples Chemicals, Inc., Philadelphia, Pa., has awarded a contract for engineering and construction work to increase the capacity of its alkylamine facilities at Wyandotte, Mich.

## New Tire Plant for Israel

Alliance Tire & Rubber Co., Ltd., a new company sponsored jointly by American and Israeli investors, has begun construction of a \$3,000,000 tire and rubber plant on a 10-acre site in the town of Hadera, midway between Haifa and Tel-Aviv, Israel. Details of the project, which is hoped to become the nucleus of an Israeli rubber industry, were revealed by Arthur Taubman, chairman of the new company and president of Advance Stores Co. Legal negotiations were handled by the law firm of Roosevelt, Freidin, & Littauer, New York, N. Y., where announcement of the new firm was made March 28.

The new company will operate with the aid of technical service supplied by Dayton Rubber Co., Dayton, O. Under a 10-year contract renewable for successive five-year periods, Dayton will design the new plant, provide advice and assistance in purchasing essential machinery and equipment, supervise installation and testing of such equipment, prepare the plant for operation, and recommend accounting, sales, and merchandising procedures. Top Israeli personnel will be trained at Dayton during the construction of the plant. Dayton will also send trained technicians to Israel to advise and assist Alliance, provide information on its processes and formulae, and also make available any future Israel patent rights at reasonable royalty rates. Dayton has no financial interest in the operation and is making no investment in Israel. Mr. Taubman explained, but is providing the technical advisory services which it offers to other countries under the Point Four program.

The new plant, expected to be completed within a year, will have 70,000 square feet of floor space, an initial labor force of 250 employees, and is designed to have a capacity of 100,000 tires and 140,000 tubes a year, plus other rubber products such as mechanical goods and automotive accessories. Total tire requirements for non-military vehicles in Israel are currently estimated at 170,000 tire and tube units a year, and this demand is expected to continue its rapid growth. In addition to use in Israel, the new plant's output will be exported to some extent in exchange for other products and commodities needed in the country.

According to Mr. Taubman, Alliance will manufacture tires made of a combination of natural and synthetic rubber, similar to those made by Dayton before the recent restrictions. Natural rubber will be purchased on the London market; while synthetic rubber, carbon black, and other compounding ingredients will be obtained from this country. Other Alliance officers are: vice chairman, S. Goren, Israel; treasurer, Ben Kravitz, Anchor Rubber Products, Inc., Cleveland, O.; assistant treasurer, H. Dan, Israel; secretary, J. Levov, Israel; assistant secretary, Mr. Kravitz; and general manager, Joseph Teicher, Israel. The Israeli officers will represent the Histadruth subsidiaries and affiliates who comprise the Israeli investors in the new company.

Rodic Chemical & Rubber Corp., New Brunswick, N. J., according to Executive Vice President P. S. Vincent, has made Donald F. Fraser vice president and general manager of the company. He is succeeded as sales manager by John S. Wade; while Raymond P. Lynch has been appointed production superintendent.

## Scrap Institute Meets

The Scrap Rubber Institute of the National Association of Waste Material Dealers, Inc., met on March 21 at the Stevens Hotel, Chicago, Ill., as part of the Association's thirty-eighth annual convention on March 19-21. President Henry M. Rose, H. Muehlstein & Co., Inc., presided over the Institute's meeting, attended by 50 members and guests, and gave his annual report. The highlight of the session was a talk by William Welch, president of Midwest Rubber Reclaiming Co.

Mr. Welch pointed out that scrap rubber represents the greatest rubber stockpile in this country, and the scrap industry together with the reclaimers must do their part in the defense program. On the other hand the statistical position of natural and synthetic rubber is such that we have a world over-production of rubber hydrocarbon. This point may be overlooked in Washington and elsewhere, but both scrap dealers and reclaimers must realize that the defense program has created an abnormal demand for scrap rubber and reclaim at high prices which may be severely affected by the dangerous world rubber surplus.

The business program included reports from the freight committee chairman, L. N. Larsen, H. Muehlstein; a discussion on honoring contracts, led by Ben Kaufman, Institute secretary-treasurer; and a pricing discussion, led by C. V. Maudlin, Washington representative of the parent association. The meeting concluded with the reelection of all officers, including Vice President Roger D. Ottignion, Nat E. Berzen, Inc. John J. Costello, Tanney-Costello, Inc., was chairman of the nominating committee.

## Awards to Firestone

Firestone Tire & Rubber Co., Akron, O., has been awarded an initial order calling for the delivery of \$4,600,000 worth of tank cannon, according to President Lee R. Jackson. Special machine tools required for the work are being installed in Akron, and delivery on the first part of the contract is scheduled to begin in May. Approximately 600 persons will be given employment in this work.

In recognition of its outstanding safety record during 1950, Firestone was presented with the National Safety Council's Award of Honor for Distinguished Service to Safety for the fifth time in six years. The Award was presented by Ned H. Dearborn, Council president, to J. E. Trainer, Firestone vice president in charge of production, on April 2. Announcement of the award was made on the simulcast of the "Voice of Firestone" radio and television program. Firestone is the only rubber company to have received this Award as many as five times, having previously been the recipient for safety records achieved in 1945, 1946, 1947, and 1948.

Texon, Inc., South Hadley Falls, Mass., having expanded its research and development activities, has added to its staff Edward O. Denzler and Frank Hill. The former had previously been with Acushnet Process Co., and the latter, with Union Bag & Paper Corp.

## General Tire Elections

Shareholders of The General Tire & Rubber Co., Akron, O., last month re-elected 14 members to the board of directors at their thirty-fifth annual meeting.

Directors reelected were: W. O'Neil, L. A. McQueen, W. E. Fouse, S. S. Poor, Robert Iredell, C. J. Jahant, M. G. O'Neil, Hayes R. Jenkins, T. F. O'Neil, John Creamer, L. L. Strauss, B. E. Smith, C. F. O'Neil, and E. W. Ross.

Ralph Harrington, advertising manager at General Tire, has been named chairman of the steering committee for outdoor advertising of the Association of National Advertisers.

## Forms Chemical Division

The formation of a chemical division to manufacture and sell chemicals, synthetic rubbers, and related products was announced by General Tire as another step in the firm's expansion and diversification program. The new division is under the jurisdiction of Michael G. O'Neil, recently appointed executive assistant to the president, and will utilize the facilities of the company's laboratories at Akron, Wabash, Ind., Azusa, Calif., and Jeannette, Pa. Edward V. Osberg has been named assistant manager of the division and will be responsible for coordinating all sales, manufacturing, and technical activities. G. S. Schaffel, formerly director of General's plastics research, is manager of manufacturing for the division and will be in charge of all plant operations and new plant construction. The primary function of the new division will be to carry through to large-scale commercial operations the many developments of the company's chemical research division.

## Purviance to General Plant in Israel

Harold W. Purviance has been named general manager of the new General Tire plant in Tel Aviv, Israel. Mr. Purviance, who left for the Israeli capital last month, after setting up organizational procedures will return to the United States to complete arrangements for the final shipments of machinery and material for the new plant. Then he will return permanently to Israel. Located on an eight-acre site in Petach Tikvah, nine miles from Tel Aviv, the new factory is scheduled to get into production late this year. It is designed to produce 80,000 to 100,000 tires the first year of production.

The 44-year-old general manager has had 20 years' experience in sales and production work in the tire industry. He has spent many years at various South American and European rubber plants. Recently Mr. Purviance did extensive work on the expansion program of General's affiliate in Portugal, Manufatura Nacional de Borracha, in Lousada. He also worked in the sales organization at the Portuguese plant.

**Eagle Industries Inc.**, 110 Washington St., New York 6, N. Y., is liquidating a large molding and rubber plant in New York, in which many presses, pumps, etc. are available. The firm is also liquidating a plant in Detroit, Mich., which was used for the manufacture of rubber floor tile. This plant may be bought either intact or piecemeal.

## Three Join Continental

Continental Carbon Co., 1400 W. 10th Ave., Amarillo Tex., last month made several additions to its staff.

Milton F. Shaffer becomes manager of the gas division in the Amarillo office. He formerly was chief production engineer with The Shamrock Oil & Gas Corp. and is well known in the oil and gas industry, having also been active in matters pertaining to conservation and proration in hearings held before the Railroad Commission of Texas.

Gerald P. Wilson has signed with Continental as head of the electrical engineering department. Mr. Wilson since 1946 has been with the electrical engineering department of Southwestern Public Service Co.

James C. Phillips, Jr., has joined the company as assistant to the director of industrial relations. He previously had been manager of the B. B. Short Distributing Co.

## Fremont Elects Officers

The Fremont Rubber Co., Fremont, O., announced last month that Robert P. Johnson had relinquished his position as president to Arthur O. Dittman, secretary of the corporation, at the annual stockholders' meeting. Mr. Johnson, however, retains his posts as chairman of the board and treasurer.

Wallace C. Gilbertson, director of sales, and Harlan L. Lea, production manager, were elected to vice presidencies. Arthur P. Reed, assistant secretary and treasurer, was elected secretary; Van R. Kanan, chief accountant, was advanced to controller. Officers reelected were Paul Clark, executive vice president; Eldon R. Frazier, vice president-research and development; Glow E. Snyder, assistant to the president.

The following directors were reelected at the stockholders' meeting: Robert P. Johnson, chairman, Paul Clark, Eldon Frazier, Claude Suhrer, and Arthur O. Dittman.

## Building New Plant

Thiokol Corp., Trenton, N. J., has announced plans for erection of a chemical plant at Moss Point, Miss., which will manufacture some of the basic chemicals used in Thiokol products. Sufficient property has been acquired for future expansion and development. It is expected that the plant will be in production by January 1, 1952.

Initially, the products made at Moss Point will be shipped to Trenton, where the present plant will continue to operate as heretofore. It is expected, however, that additional facilities will be provided at the Moss Point plant for the manufacture of other chemicals and special synthetic rubbers.

**Brown Co.**, Berlin, N. H., has announced that its general sales offices are now located at 150 Causeway St., Boston 14, Mass., and that a regional sales office will be maintained at Suite 925, 500 Fifth Ave., New York 18, N. Y.

## More Silicone Coming

The production of silicones will be expanded here and abroad in 1951, according to R. O. Sauer, of General Electric Co.'s chemical department, Pittsfield, Mass., speaking before the Chicago Section of the American Chemical Society. There are now three companies, including G-E, in the United States actively manufacturing silicones on a sizable scale. It is estimated that these companies manufactured several thousand tons of silicone products last year and, together with other segments of the chemical industry, will expand their production considerably this year. Another factor in forthcoming production increases in silicones is the indication that additional domestic concerns may soon be manufacturing similar products at either full-scale or pilot-plant levels, Mr. Sauer said, and it seems certain that additional production facilities will soon be available in Europe. The recent and great interest in silicones in this country is shown by the fact that less than 10 patents in this field were issued prior to 1940, but by the end of 1950 the number of patents was close to 400.

## G-E Transfers Personnel

Thomas H. Way, manager of the G-E Taunton, Mass., plant, has been named to the chemical department's manufacturing division staff at Pittsfield, Mass., and has been succeeded at Taunton by G. S. Berge, of the plastics division.

Mr. Way had previously been with Murray Body Corp., for two years, with Houdaille-Hershey Corp., as divisional control manager, and with Stevenson, Jordan & Harrison as a management engineer.

Mr. Berge, who started with General Electric in 1941 as a test engineer, completed the test program in 1944 and went with the G-E carbon products division for a year. He then became quality control coordinator on the apparatus department manufacturing staff and later a metallurgy division salesman and sales development supervisor for the company's silicone rubber.

Anthony F. Forni has been appointed mycalex sales development supervisor for the plastics division of the chemical department. Mr. Forni formerly had been a production engineer with General Chemical. Then in 1943 he went with Firestone Steel Products Co. in the same capacity. After three years as a lieutenant in the Navy, Mr. Forni rejoined G-E as a market research analyst. Prior to his recent appointment he was advertising editor for silicones and molded plastics.

## General Cable Elections

At the April 17 meeting of the board of directors of General Cable Corp., 420 Lexington Ave., New York 17, N. Y., D. R. G. Palmer was elected chairman of the board and chief executive officer of the corporation; while J. R. MacDonald was elected president.

Mr. Palmer has been with the General Cable organization since 1919 and has been president since 1933. He is also a director of American Smelting & Refining Co. and Metal Textile Corp. Mr. MacDonald joined General Cable in 1940 and became first vice president in 1947.

## Goodyear Executive Changes

P. W. Litchfield on March 26 was re-elected chairman of the board of The Goodyear Tire & Rubber Co., Akron, O., marking his twenty-fifth year as chief executive officer of the company. The election took place at the directors' meeting, which followed the annual meeting of stockholders.

E. J. Thomas, president since 1940, was re-elected at the meeting. Other officers reelected were: R. S. Wilson, P. E. H. Leroy, R. DeYoung, J. M. Linforth, R. P. Dinsmore, F. W. Cliner, vice presidents; H. L. Hyde, vice president and general counsel; Z. C. Oseland, treasurer; W. D. Shilts, secretary; C. H. Brook, comptroller; H. W. Hillman and J. F. Bennett, assistant treasurers; W. M. Mettler and R. H. Miner, assistant secretaries; H. L. Riddle and J. E. Caldwell, assistant comptrollers. J. W. Roberts was elected an assistant comptroller to succeed the late H. D. Hoskin.

Mr. Roberts will be in charge of factory accounting for all Goodyear rubber, plastic, and cotton mills in the United States.

B. D. Scherer succeeds Mr. Roberts as chief works accountant for the company's domestic rubber mill operations, Pathfinder Chemical Corp., and cotton mill operations.

W. W. Sauvary, assistant to the chief works accountant since 1946, has been appointed assistant chief works accountant of all Goodyear Tire domestic rubber operations.

Mr. Roberts, a veteran of 34 years in Goodyear accounting operations, joined the production statistics department in 1917. After service in World War I he returned to Goodyear in July, 1919. In 1926, Mr. Roberts was placed in charge of factory accounting, five years later was named manager of production costs and factory accounting; was appointed chief works accountant in 1944, and was named to handle domestic manufacturing operations three years later.

Mr. Scherer, assistant chief works accountant since 1947, has been with the company 17 years. After starting with the production squadron in 1934 he served successively as assistant works accountant at Goodyear plants at Jackson, Mich., and St. Marys, O., and at Goodyear Aircraft; as assistant manager in charge of factory costs accounting (1943), works accountant (1944); and assistant chief works accountant (1947).

Mr. Sauvary, with Goodyear since 1936, handled statistics, engineering costs, and property records prior to his appointment in 1944 as assistant works accountant. He was named assistant to the chief works accountant in 1946.

Promotion of two Goodyear development engineers has also been announced.

W. H. DeBruin, in farm tire development at Akron for the past five years, becomes resident contact engineer in Detroit. Replacing him is T. J. Thaden, for the past three years with tractor tire design.

DeBruin, in his new position, will contact the automotive trade in the Detroit area. With the firm nearly 25 years, he started in the efficiency department. He has held various engineering jobs at Goodyear and was also in production, being stationed for a time at the California plant. During World War II he was associated with the production of Corsair fighter planes at Goodyear Aircraft Corp. After the war he transferred to farm tire development.

Thaden joined Goodyear some five years ago as a member of the training squadron, then was in mold design before entering tire development.

Clinton O. McNeer, Chicago district sales manager for the chemical division has been named sales manager of the division, with headquarters at Akron. He is succeeded at Chicago by J. A. Weatherford, for some time a special representative for the chemical organization in the Chicago territory.

A district office has also been established at St. Louis, with Robert E. Workman as manager. He had been serving accounts in the St. Louis area as a field representative reporting to McNeer in Chicago.

Creation of the sales manager post was prompted by the rapid expansion of sales activities by the chemical division. Since the last war this organization has grown from a small plastics and coatings department into a major division of the company and one of the fastest growing plastics and rubber chemical operations in the nation. Included among the materials marketed by the division are a series of styrene-butadiene copolymers, vinyl resins, synthetic rubbers, rubber and resinous latices, rubber chemicals, and adhesives.

Mr. McNeer will take over the direction and coordination of all sales activities with representatives in New York, Washington, Boston, Cleveland, Chicago, Los Angeles, San Francisco, Philadelphia, Atlanta, and St. Louis.

Mr. McNeer has been with Goodyear for 17 years. Following about five years at the St. Marys plant on Pliofilm production, he became a technical adviser on plastic coatings and was assigned to field work at Cincinnati in 1946, transferring to the Chicago district two years later.

Mr. Weatherford started with Goodyear in 1942 in the research laboratories. After several years as laboratory manager at the Goodyear operated synthetic rubber plants owned by the government, at Houston, Tex., and Akron, he returned to Goodyear's laboratories as a development chemist in 1948 and later assumed sales duties in Chicago.

Mr. Workman also joined Goodyear in 1942. After extensive service in the research laboratory, he was assigned to the chemical division and was sent to St. Louis as a field representative in 1948.

H. J. Lafaye has been appointed sales manager and W. J. Lee, assistant general manager in Goodyear's rim division.

Lafaye joined the rim sales department in 1935 and was made assistant sales manager eight years later.

Lee became affiliated with Goodyear in 1922 and after completing squadron training in 1925 was transferred to tire design, where he remained until 1937, when appointed assistant superintendent of Goodyear-Java. In 1939, Lee was returned to Akron to head the truck tire design department and in 1942 was appointed technical contact man in the manufacturers' sales division. He began his duties as Detroit resident engineer a year later.

E. M. Joyce, Detroit petroleum sales representative for the Goodyear company since February, 1950, has been assigned to the auto tire department in Akron as a staffman. He replaces Lawrence T. Earley, transferred to the manufacturers' sales department at Akron in a senior staff assignment.

Joyce joined Goodyear in 1948. Following training as a field representative, he was appointed tire department fieldman in the Minneapolis district, but in 1949

was transferred to petroleum sales as a special representative in the same district; then he was moved to Detroit.

Earley's entire Goodyear service has been in sales. He started with the company in 1932, held retail sales posts in Youngstown and Pittsburgh, and for five years was field representative in the Cleveland district, specializing in petroleum products. Shortly after Pearl Harbor, Earley was transferred to The Goodyear Aircraft Corp., handling customer-engineering contacts until 1945 when he returned to Goodyear Tire, joining the sales staff of the retread & repair material division of the auto tire department. In 1948, he was appointed manager of the automotive jobber department, a post he held until 1949, when transferred to auto tire sales.

H. A. Endres, assistant manager of research for Goodyear, spoke on the use of rubber in bituminous concrete pavements at the twelfth annual Highway Engineering Conference of the University of Utah, held in Salt Lake City on April 2. Mr. Endres described Goodyear's development work on this type of pavement in this country and reported results on test surfaces in Akron and other cities. A supplementary talk was given by H. B. Pular, president of Barry Asphalt Co., who discussed the actual use of rubber in large-scale construction projects.

## To Make Artillery Propellant Charges

Goodyear is returning to one of its wartime roles as a producer of propellant charges for artillery, according to President E. J. Thomas. Under a recently signed agreement with the government the company will begin rehabilitation and then the operation of the Hoosier Unit of Indiana Arsenal, Charlestown, Ind. Goodyear operated this plant from 1940-1945, and operations on a reduced scale were continued by the government since that time. Production of explosive charges will be expanded by Goodyear after the rehabilitation program has been completed.

Roland H. Gray is being transferred from his present position as vice president of the company's cotton mills subsidiary to that of resident manager of the Hoosier plant; while the production manager will be H. R. Child, now plant manager of Goodyear's Akron Plant C. Both men held the same positions during the war period, and other key management positions will be filled by men associated with the project in the past.

**Dayton Rubber Co.,** Dayton, O., announced the start of a nationwide "save your tire" conservation program early in April. According to Vice President Irve Eisbrough, the program is designed to aid and supplement the government's effort to conserve new rubber and has converted Dayton dealers and distributors into tire conservation depots. The two-point program includes: (1) a tire inspection clinic where an expert will inspect, free of charge, every tire and record its condition, noting any injuries and recommending what can be done to keep it serviceable; and (2) a booklet, "How to Stretch Tire Mileage to the Utmost," giving handy tips on tire conservation, and presented to every motorist visiting any of the thousands of clinics. The six-page booklet tells motorists how to maintain correct air pressures in tires, how to rotate tires at regular intervals, how to check for tire injuries, and how to achieve driving habits that will extend tire life.



David L. Matthews

### Matthews Plant Manager

David L. Matthews has been appointed plant manager of the Avon Lake, O., general chemicals plant of B. F. Goodrich Chemical Co., 324 Rose Bldg., Cleveland 15, O. Matthews was associated with John Deere Co. and U. S. Gypsum plant engineering and construction work before joining Goodrich in 1940. He first worked as maintenance engineer at the Akron chemical plant and in 1941 moved to Louisville, Ky., as process construction engineer of the company's Geon polyvinyl chloride resin plant. He served as plant engineer there from 1942 until late last year, when he was transferred to the Avon Lake plant as project engineer.

### Richardson Elected BFG Vice President

William S. Richardson, president of Goodrich Chemical, has been elected a vice president of The B. F. Goodrich Co., Akron, O., but will continue as president of the chemical company.

Richardson has been with the rubber industry since 1914. He joined Goodrich in 1926 as manager of the planning department in Akron and two years later became staff superintendent of the industrial products division. Richardson served as general manager of the industrial products and sundries sales division from 1941 to 1945 and also was chairman of the OPA mechanical rubber goods industry advisory committee during World War II. He was elected president of the chemical company when it was organized in 1945.

**United States Rubber Co.,** Rockefeller Center, New York 20, N. Y., on April 17 held its annual meeting of stockholders at Passaic, N. J., when Board Chairman Herbert E. Smith reported record business for the first quarter of 1951. But he warned that under present uncertain conditions this high level of business might not continue for the balance of the year.

Stockholders also elected two new directors, H. Gordon Smith and John W. McGovern. The former, with the company since 1917, has been vice president and general manager of the textile division since 1945. Mr. McGovern came to the company in 1920 and since 1945 has been vice president and general manager of the tire division.

## WEST

### 3M Expansion Plans

Details of a \$6,500,000 plant expansion program were announced April 16 by Minnesota Mining & Mfg. Co., St. Paul, Minn. R. P. Carlton, 3M president, said the firm is expanding facilities at Atlanta, Ga.; Bristol, Pa.; Buffalo, N. Y.; Cleveland, O.; Lemont, Ill.; Wayne, Mich.; Boston, Mass.; and Hastings, Hutchinson, and St. Paul, Minn.

He further said the expansion program would provide additional manufacturing and storage facilities for all of 3M's major production divisions. The firm manufactures a wide variety of products including coated abrasives, pressure-sensitive adhesives, reflective sheeting, electrical and sound recording tapes, chemicals, and other products.

The projects mark the latest step in a long-range building program. The company spent \$47 million for expansion purposes in the five-year period ending in 1950.

Construction of the following projects is under C. P. Pesek, vice president of engineering and properties.

Construction of a new sales office and warehouse at Atlanta, scheduled to start soon, is expected to be completed by September 1. This two-story structure will provide 36,000 square feet of floor space. Alteration of the present plant at Bristol and installation of additional production equipment, now under way, is expected to be completed by January 1, 1952. Work has also begun on a one-story warehouse containing 120,000 square feet. Completion is set for October 1.

A one-story structure containing 16,000 square feet, for offices and warehouse space, is being built at Buffalo and is scheduled for completion October 1.

Another one-story building is expected to be ready on or about June 1 in Cleveland. Work on this 30,000-square-foot office and warehouse building was begun last fall.

Improved tape storage facilities are now being built into a recently completed warehouse at Hutchinson.

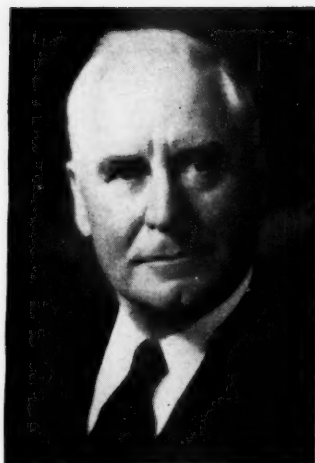
A 4,000-square-foot addition to the present warehouse at Lemont is expected to be ready late this month.

Recently purchased buildings containing 60,000 square feet at Wayne are being altered to accommodate adhesives and coatings operations. A 12,000-square-foot addition is also being constructed. Work on all buildings should be finished in September.

A one-story office and warehouse building containing 25,000 square feet is now under construction at Boston, to be ready late this year.

A pilot-plant for the study and production of synthetic polymers for resins and tape adhesives and a pilot-plant for research and production of fluorocarbons are due for completion by late August at Hastings. Together both buildings contain about 10,000 square feet. Construction of additional storage tanks for solvents and other raw materials is due for completion this month. A new 50,000 square-foot warehouse, also in Hastings, should be ready early next year.

The minerals buildings at St. Paul, damaged in an explosion February 8, will be rebuilt and expanded. The work is scheduled for completion this fall.



Fernley H. Banbury

### Purdue Receives Banbury

Fernley H. Banbury, inventor of the internal mixer which bears his name, has presented a laboratory-size Banbury mixer of latest design to Purdue University. Dr. Banbury was graduated from Purdue in 1906, and the University in 1948 conferred on him the honorary degree of Doctor of Engineering.

The first Banbury mixer was built in 1916 at the Derby, Conn., plant of Farrel-Birmingham Co., Inc., and has since been developed to a high degree of efficiency and usefulness. Only 2,000 mixers have been built for worldwide use; yet practically all rubber products made in the past generation, as well as paint and varnish stocks and a wide variety of the more recently developed plastics, have been processed in these machines.

Although retired since 1943, Dr. Banbury is still active as a consultant and maintains a special interest in experimental work. He also continues to serve on the board of directors of Farrel-Birmingham, sole manufacturer of the Banbury mixer in this country.

Very few university laboratories are equipped with Banbury mixers, and the one just received by Purdue is the most modern in design and has the latest control devices. It is suitable for the recently developed Lancaster-Banbury process of devulcanizing and reclaiming scrap rubber, as well as for mixing.

**W. J. Voit Rubber Corp.,** Los Angeles 11, Calif., has established the William J. Voit Football Memorial Award for presentation to the most valuable player in the Pacific Coast Conference each year. The award was announced by Willard D. Voit, company president, in honor of his father who founded the firm. The trophy was dedicated in a ceremony attended by many sports notables on February 21 at the Hollywood Roosevelt Hotel. According to Mr. Voit, the award will be made through a vote of the Conference coaches beginning this season. The selected player will receive a smaller replica of the trophy for himself, and his name will be inscribed on the large perpetual award which will stand in the Helms Athletic Foundation's football room.

## THE STORY BEHIND THE WORD...



Oddly enough the name of this pretty songbird came from the Latin word for dog. For the early Roman mariners who discovered the Canary Islands named them *Canaria* from their word "canes", because of the packs of dogs that infested the island. The birds that came from this place were named after the English version of the Island's name—Canary.

A long record of strength, stability and progressive leadership has made the word Muehlstein—the First Name in Scrap Rubber and Scrap Plastic.

# H. MUEHLSTEIN & CO. —INC.—

60 EAST 42nd STREET, NEW YORK 17, N. Y.

BRANCH OFFICES: Akron • Chicago • Boston • Los Angeles • Memphis  
WAREHOUSES: Akron • Chicago • Boston • Los Angeles • Jersey City

CRUDE RUBBER • SYNTHETIC RUBBER • SCRAP RUBBER • HARD RUBBER DUST • PLASTIC SCRAP

Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill., has elected Harold G. Ingersoll a vice president of the company. Besides his new office Mr. Ingersoll retains the presidency of the corporation's Ingersoll steel division at Newcastle, Ind. He is also a member of the Borg-Warner board of directors.

Carl R. Brick has been made an assistant to Roy C. Ingersoll, president of Borg-Warner. Mr. Brick has served for several years as the corporation's industrial training consultant.

S & G Rubber & Record Co. is enlarging its plant at 1401 Mateo St., Los Angeles, Calif.

## CANADA

### Rubber Consumption Down

The Dominion Bureau of Statistics, Ottawa, Ont., has reported that consumption of rubber in January, 1951, totaled 17,952,898 pounds, down from the 18,049,744 pounds consumed in December, 1950. Consumption in January was broken down into 9,683,330 pounds of natural rubber, 4,991,145 pounds of synthetic, and 3,278,423 pounds of reclaim. The respective figures for December, 1949, follow: 10,093,570, 4,862,045, and 3,094,129 pounds.

Domestic production of synthetic rubber also declined in January, to 11,710,720 pounds from 11,744,320 pounds in December; but reclaim output rose to 1,072,960 pounds in January from 1,005,760 pounds the month before.

Month-end stocks of natural rubber advanced to 9,228,800 pounds on January 31 from 7,663,000 pounds on December 31; synthetic, to 7,087,360 pounds from 6,753,600 pounds; and reclaim, to 4,074,560 pounds from 3,831,000.

Gross factory value of products manufactured by the rubber industry of Canada in 1949, the Dominion Bureau of Statistics recently reported in a review of the industry, amounted to \$178,504,000, 8% below the preceding year's value of \$194,112,000 and 9% below the all-time high of \$196,308,000 in 1947.

Sixty-two establishments were in operation in 1949, furnishing employment to 20,729 persons who received \$43,172,000 in salaries and wages, as compared with 56 plants with 21,703 employees earning \$48,273,000 in 1948. Plants in Ontario employed about 70% of the persons engaged in the industry and accounted for about 81% of the entire output; while plants in Quebec accounted for about 29% of the total employment and 18% of production.

Production of rubber tires and tubes had a factory selling value of \$96,672,000, as compared with \$107,136,000 in 1948; rubber footwear, \$29,760,000, compared with \$36,608,000; and other products, \$52,071,000, compared with \$50,368,000.

Dominion Rubber Co., Ltd., Montreal, P.Q., has received from the Canadian Commercial Corp., Canada's government purchasing agency, a contract for inflatable sleeping pads valued at \$117,681.

## NEWS ABOUT PEOPLE



Douglas G. Parizeau

Douglas G. Parizeau has been appointed sales representative for the Baker Castor Oil Co., New York, N. Y., and will cover Minnesota, Wisconsin, Illinois, and Indiana from the company's Chicago office, 105 West Adams St. Previous to his association with Baker Castor Oil, which dates from 1950, he was with Southern Cotton Oil Co., as a chemist in 1947 and with Sterling Drug Co., in the same capacity in 1948 and 1949.

William J. Roemer has been selected to succeed the late Frank A. Jepson as purchasing agent of the Acushnet Process Co., New Bedford, Mass. He leaves the Bristol Mfg. Co., where he was purchasing agent, after a span of 28 years.

J. J. Melniker, president of New York Furniture Exchange, Inc., at the recent annual meeting of American Hard Rubber Co., 11 Mercer St., New York 13, N. Y., was elected a director to fill a vacancy on the board.

A. J. McKnight is now vice president and general manager of Arrowhead Rubber Co., Los Angeles, Calif. He previously had been connected with the parent organization, National Motor Bearing Co., Inc., Redwood City, Calif.

Thomas W. Smith, Jr., president of The Sun Rubber Co., Barberton, O., has been named a trustee of the Akron Art Institute.

Curtis Franklin has been elected chairman of the board of Automatic Steel Products, Inc., Canton, O. He has been secretary, treasurer, and a director of the company.

Jerome T. Shaw, editor of *Tires Service Station*, also published by Bill Brothers Publishing Corp., recently was elected president of the Greater New York Tire & Battery Association for 1951.

Charles A. Stokes, director of research and development for Godfrey L. Cabot, Inc., Boston, Mass., Lawrence F. Mims, plant manager, Cabot retort chemical division, Gainesville, Fla., and Raoul S. Dobyns, plant engineer, retort chemical division, were among eight graduates of the University of Florida to receive the "Professional Degree of Chemical Engineer" at recent mid-year commencement exercises.

Cooke Bausman, Jr., has been made manager of the sales department, central staff, Koppers Co., Inc., Pittsburgh 19, Pa. Mr. Bausman joined the company in September, 1948, as assistant manager of the sales department and since November 1 has been acting manager of the department.

## OBITUARY

### Arthur B. Fennell

ARTHUR B. Fennell, 64, trade sales manager, United States Rubber Co., tire division, Rockefeller Center, New York 20, N. Y., died suddenly at his home in New York on April 1.

A native of Buffalo, N. Y., he joined the rubber company as a tire salesman in 1912 at the Buffalo branch. In a series of promotions he served in many important capacities including district managerhips at Buffalo, Philadelphia, and New York. He also was trade sales manager and general sales manager of the U. S. Tires division at various periods.

In his younger days Mr. Fennell had acquired considerable fame as a minor league baseball player.

He is survived by his wife, two daughters, three sisters, and a brother.

Funeral services were held at Frank E. Campbell funeral home, New York, April 4. Interment was at George Washington Memorial Park, Paramus, N. J.

### Lucien L. King

LUCIEN L. KING, prominent New York advertising executive, who served as advertising manager for The Goodyear Tire & Rubber Co., Akron, O., between 1911 and 1927, died at a hospital in New York, N. Y., March 27, after several years of poor health. Funeral services were held in Wadsworth, O., on March 29, with burial in Woodlawn Cemetery, there.

Mr. King was born in Lodi, O., April 22, 1888. He was graduated from Buchtel College in 1911, the same year he joined Goodyear. He served as advertising manager of the company until 1927 when he established his own outdoor advertising company. He liquidated his concern in 1930 and subsequently was employed by several leading advertising agencies.

The widow survives.

# CIRCOSOL-2XH OFFERS 5 ADVANTAGES AS ELASTICATOR FOR GR-S...REGULAR AND COLD

Increased use of synthetic rubber makes the unique elasticator  
Circosol-2XH increasingly important to compounders

## 1. SPECIALLY REFINED FOR RUBBER-PROCESSING

Circosol-2XH is not an ordinary mineral oil. It's a petroleum-base process aid, refined within rigid specifications solely to meet the exacting requirements of rubber compounders. The product is a heavy viscous liquid, clear, transparent, and with a pale green color as observed by transmitted light. It is composed of hydrocarbons of comparatively high molecular weight entirely derived from selected crude petroleums. Its low volatility precludes any fuming and losses during mixing in the banbury and processing on the mills.

## 2. ASSURES PRODUCT UNIFORMITY

Circosol-2XH is refined under precision-controlled conditions permitting no deviation from specifications. It minimizes the danger of product variation. To quote the technical superintendent of a large rubber company: "With Circosol-2XH you never have to worry about results being different."

## 3. HIGH NAPHTHENICITY

Leading rubber technologists are unanimous in agreeing that hydrocarbons with a high degree of naphthenicity are best suited for processing and plasticizing rubber. Sun's exclusive refining process retains the high naphthenicity of the selected crudes from which Circosol-2XH is derived.

## 4. CAN BE USED WITH ALL COLORS

Unlike products offered in competition with it, Circosol-2XH is a light-colored compound. It can therefore be used in such items as white footwear, hospital sheeting, white seals and gaskets.

## 5. GIVES GR-S EXTRA RESILIENCE

Circosol-2XH improves the rebound so necessary for many uses. Furthermore, heat build-up is low — in tire tread extrusion, for example.

### "JOB PROVED"

Circosol-2XH has been used by rubber processors for over seven years. Hundreds of them know from experience the high perform-

ance and durability of goods processed with Circosol-2XH.

## TECHNICAL ASSISTANCE OFFERED

Every user of Circosol-2XH is entitled to the technical assistance of Sun's trained and widely experienced rubber technologists. For further information, just call or write the Sun Office nearest you.

## TYPICAL COLD RUBBER TREAD COMPOUND USING CIRCOSOL-2XH

GR-S-478 . . . . .	100.00
ZnO . . . . .	3.00
HAF BLACK . . . . .	50.00
FLEXAMINE . . . . .	1.25
STEARIC ACID . . . . .	2.00
SULFUR . . . . .	1.80
SANTOCURE . . . . .	1.25
CIRCOSOL-2XH . . . . .	10.00

## PHYSICAL PROPERTIES (60' cure @ 292 F)

TENSILE, psi . . . . .	3455
MODULUS (300%), psi . . . . .	1775
ELONGATION, % . . . . .	505
SHORE A HARDNESS . . . . .	59
REBOUND (Goodyear-Healy), Room Temp. . . . .	57
HEAT BUILD-UP (Goodrich), deg. Fahr. . . . .	68

# SUN INDUSTRIAL PRODUCTS

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL



## Edgar E. Morris

**EDGAR E. MORRIS**, works manager of Brown Co., Berlin, N. H., died suddenly on March 27 at a hospital in Portland, Me.

In 1912, Mr. Morris went to work for the old Berlin Mills Co., and in 1917 joined the accounting department where he was eventually promoted to chief accountant. In 1928, the deceased was licensed by the State Bank Commissioner to practice as a certified public accountant, after having successfully passed examinations before the American Institute of Accountants.

In 1932 he was named superintendent of the paper division of Brown Co., which included the Cascade and Riverside mills. He was promoted to works manager in November, 1944. In this capacity Mr. Morris was responsible for all manufacturing operations of the company. He was born in Gorham, N. H., in 1895.

## Howard D. Hoskin

**IN FAILING** health for some time, but still active on his job, Howard D. Hoskin, since 1920 assistant controller for Goodyear Tire & Rubber Co., Akron, O., died at his home in Akron on March 22. Services were conducted at Billows Chapel on March 24, followed by burial at Rose Hill Cemetery, Akron.

Mr. Hoskin was born in Randolph, O., June 10, 1880. He attended grade and high school.

Shortly after graduation in 1896 he found employment with Enterprise Mfg. Co., Akron. He joined Goodyear in an accounting capacity in October, 1899. He left, however, in 1904 to work for New Jersey Car Spring & Rubber Co., Jersey City, N. J., but returned to Goodyear on January 1, 1907, as manufacturing factory accountant.

The deceased belonged to the Portage Country and the Akron City clubs. He leaves his wife.

## John E. Smith

**A HEART** attack caused the death, on March 14, of John E. Smith, president of The R.C.A. Rubber Co. and executive vice president of The Eclat Rubber Co., both of Akron, O. He was at his home in Silver Lake, O.

Mr. Smith was born June 28, 1891, in Dowlais, South Wales, where he attended grade schools. He came to the United States about 45 years ago.

In 1919 he started with Eclat as factory manager and became its vice president and general manager in 1935. When R.C.A. was formed in 1931, Mr. Smith took on the added duties of its vice president and general manager. He was made president in 1946.

The deceased was very active in choral singing groups and Kiwanis International. He was also a charter member of the (new) Church in Silver Lake and its moderator.

Survivors include three daughters, six grandchildren, two sisters, and a brother.

Funeral services were held March 17 at McGowan's Funeral Home, Cuayhoga Falls, O., followed by interment in Crown Hill Cemetery, Twinsburg, O.

## A. H. Andreoli

**DEATH** came suddenly to Andre H. Andreoli on February 20 in Amsterdam, Netherlands, where he had been born 50 years ago.

The family migrated to Akron, O., in 1911, and the deceased attended local grade and high schools and Buchtel College.

After four years of business experience Mr. Andreoli in 1922 joined the Goodyear Tire & Rubber Co., first in its aeronautical division and finally in its export organization. He was a field sales representative in the Netherlands and Netherlands India. Then in 1931 he switched to The General Tire & Rubber Export Co. as manager of its Netherlands branch. This service was terminated with the outbreak of World War II and the German occupation of Holland. After hostilities ceased Mr. Andreoli started his own firm, General Import Nederland, which represented General Tire exclusively in the Netherlands.

Mr. Andreoli is survived by his wife, six children, a sister, and a brother, Joseph, executive vice president of General Tire & Rubber Export Co.

## Kenneth E. Pierce

**KENNETH E. PIERCE**, 36, general credit manager of Dominion Rubber Co., Ltd., Montreal, P.Q., Canada, and national president of the association of Kinsmen Clubs, died April 18 in a Montreal hospital. Native of Moncton, N. B., he joined Independent Rubber Co., a subsidiary of Dominion Rubber, there in 1933, and, after rising to the position of branch accountant, was transferred in 1936 to the head office of Dominion in Montreal.

Mr. Pierce served throughout the second World War in the Royal Canadian Navy with the rank of lieutenant, special branch.

## Henry K. Hirth

**HENRY KARL HIRTH**, 48, newly appointed European manager for The Firestone Tire & Rubber Export Co., died March 13, in Buenos Aires, Argentina. He suffered a heart attack while attending a farewell party in his honor. He had been due to leave Buenos Aires for Akron en route to his new assignment in Paris, France. He had been manager of Firestone's Argentine company in Buenos Aires.

A native of Germany, Mr. Hirth had been a naturalized United States citizen many years. He came to Akron in 1931 to join Firestone's export department; then in 1934 he went to Bombay, India, as managing director of Firestone's Indian subsidiary. In 1939 he became general manager of the plant which Firestone built in Bombay that year. He returned to Akron in 1945, leaving the following year to become general manager of Firestone plant in Buenos Aires.

Mr. Hirth is survived by his wife and a daughter.

**American Hard Rubber Co.**, New York, N. Y., and subsidiary. For 1950: net income, \$902,773, equal to \$8.91 a common share, contrasted with net loss of \$231,707 in 1949.

# FINANCIAL

**S. S. White Dental Mfg. Co.**, Philadelphia, Pa., and subsidiaries. For 1950: net income, \$833,192, equal to \$2.38 each on 349,919 capital shares, compared with \$805,582, or \$2.69 each on 298,918 shares the year before.

**Westinghouse Air Brake Co.**, Wilmerding, Pa., and subsidiaries. Year to December 31, 1950: net income, \$11,276,058, equal to \$3.55 each on 3,172,110 capital shares, contrasted with \$9,968,145, or \$3.14 a share, the year before; net sales, \$62,032,321, against \$76,056,685; income taxes, \$8,678,000, against \$6,296,000; current assets, \$79,562,235, current liabilities, \$18,500,815, against \$72,632,912 and \$14,452,665, respectively, on December 31, 1949.

**U. S. Rubber Reclaiming Co., Inc.**, Buffalo, N. Y. For 1950: net income, \$507,759, against \$83,486 in 1949.

**United States Rubber Co.**, New York, N. Y., and subsidiaries. Twelve months to December 30, 1950: net income, \$24,657,647 (a record) equal to \$11.04 each on 1,761,092 common shares, contrasted with \$15,100,072, or \$5.62 a share, in 1949; net sales, \$695,755,923 (a new high), against \$517,439,676; income taxes, \$34,144,486, against \$7,995,669; current assets, \$280,372,183, current liabilities, \$112,461,434, against \$226,922,115 and \$58,983,606, respectively, the end of 1949.

**United Engineering & Foundry Co.**, Pittsburgh, Pa. For 1950: net earnings, \$5,298,884, equal to \$6.39 a common share, compared with \$5,654,080, or \$6.83 a share, the year before; net sales, \$66,860,759 a record, against \$63,281,618; income taxes, \$4,684,000, against \$4,204,000.

**United Elastic Corp.**, Easthampton, Mass., and wholly owned subsidiaries. For 1950: net income, \$1,732,411, equal to \$7.73 each on 224,250 capital shares, against \$1,317,477, or \$5.88 each on 149,500 shares, in 1949.

**United Carbon Co.**, Charleston, W. Va., and subsidiaries. For 1950: net income, \$3,364,654, equal to \$4.23 a share, compared with \$2,866,534, or \$3.60 a share the year before; net sales, \$29,780,195, against \$21,555,495.

**Union Carbide & Carbon Corp.**, New York, N. Y., and subsidiaries. For 1950: net income, \$124,111,851, equal to \$4.30 each on 28,806,344 capital shares, compared with \$92,210,192, or \$3.20 a share, in the preceding year; net sales, \$758,253,539, against \$585,781,441; income and excess profits taxes, \$113,693,689, against \$53,644,219.

**Union Asbestos & Rubber Co.**, Chicago, Ill. Twelve months to December 31, 1950: net income, \$325,842, equal to 68¢ each on 475,176 capital shares, compared with \$599,648, or \$1.21 each on 494,376 shares, in 1949; net sales, \$8,089,712, against \$8,790,115; federal income taxes, \$216,000, against \$375,000.

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**Timken Roller Bearing Co.,** Canton, O., and subsidiaries. Twelve months to December 31, 1950: net income, \$15,402,720, equal to \$6.36 each on 2,421,380 capital shares, contrasted with \$3,530,617, or \$1.46 a share, in the preceding year; net sales, \$144,954,617, against \$99,437,803; income taxes, \$15,280,000, against \$3,124,000.

**Thiokol Corp.,** Trenton, N. J. For 1950: net income, \$90,670, against \$73,234 in 1949; sales, \$2,522,382, against \$1,680,017; federal income taxes, \$59,000, against \$45,301; current assets, \$1,135,386, current liabilities, \$285,340, against \$1,006,916 and \$207,515, respectively, on December 31, 1949.

**Thermoid Co.,** Trenton, N. J., and subsidiaries. For 1950: net earnings, \$1,927,895, equal to \$2.26 a share, contrasted with \$892,642, or \$1.01 a share, the year before; taxes, \$2,053,420, against \$619,406; working capital, \$6,085,000, against \$4,816,000.

**Sun Oil Co.,** Philadelphia, Pa., and subsidiaries. Twelve months to December 31, 1950: net income, \$36,291,498, equal to \$6.02 a common share, compared with \$25,177,875, or \$4.57 a share, a year earlier; federal income taxes, \$9,400,000, against \$5,200,000.

**Socony-Vacuum Oil Co., Inc.,** New York, N. Y. For 1950: net income, \$128,216,683, equal to \$4.03 a common share, contrasted with \$98,329,305, or \$3.09 a share, in the preceding year; sales, \$1,367,112,433, against \$1,226,698,775; federal income taxes, \$43,400,000, against \$17,700,000.

**Seiberling Rubber Co. of Canada, Ltd.,** Toronto, Ont., Canada. For 1950: net profit, \$274,672, equal to \$5.49 a share, against \$22,149, or 44¢ a share, the year before; working capital, \$1,500,016, against \$1,369,368 on December 31, 1949.

**Seiberling Rubber Co.,** Akron, O., and subsidiaries. For 1950: net income, \$2,315,560, equal to \$5.26 each on 301,010 a common share; contrasted with net loss of \$359,351 the year before; net sales, \$38,321,118, against \$25,338,774; income taxes \$2,441,019, against \$11,089; current assets, \$14,087,591, current liabilities, \$4,639,281, against \$10,209,213 and \$2,154,956, respectively, on December 31, 1949.

**St. Joseph Lead Co.,** New York, N. Y., and subsidiaries. Year ended December 31, 1950: net earnings, \$12,211,615, equal to \$4.94 each on 2,469,320 shares, compared with \$8,564,436, or \$3.47 a share, the year before; net sales, \$103,871,429, a record, against \$82,724,099.

**Raybestos-Manhattan, Inc.,** Passaic, N. J., and domestic subsidiaries. For 1950: net profit, \$4,868,769, equal to \$7.75 each on 628,100 capital shares, compared with \$2,047,360, or \$3.26 a share, in the previous year; net sales, \$65,444,666, against \$48,770,486; income taxes, \$4,575,000, against \$1,289,165; current assets, \$27,984,368, current liabilities, \$8,039,112, against \$21,721,537 and \$4,438,341, respectively, the end of 1949.

**Phillips Petroleum Co.,** Bartlesville, Okla., and subsidiaries. For 1950: net income, \$51,557,264, equal to \$8.51 a share, compared with \$44,514,371 or \$7.36 a share the year before; federal income taxes, \$26,191,300, against \$14,621,034.

**O'Sullivan Rubber Corp.,** Winchester, Va. For 1950: net profit, \$315,352, equal to 72¢ a common share, against net loss of \$63,248 the year before.

**New Jersey Zinc Co.,** New York, N. Y. For 1950: net earnings, \$10,024,295, equal to \$5.11 a share, compared with \$4,890,956, or \$2.49 a share, in 1949.

**National Rubber Machinery Co.,** Akron, O. For 1950: net profit, \$335,821, equal to \$2.18 each on 154,000 capital shares, contrasted with net loss of \$31,331 a year earlier; net sales, \$5,196,587, against \$3,717,721.

**National Automotive Fibres, Inc.,** Trenton, N. J., and subsidiary. For 1950: net profit, \$4,779,025, equal to \$4.80 each on 996,145 shares, against \$4,416,675, or \$4.43 a share, in the preceding year; sales, \$76,053,409, against \$64,540,533; income taxes, \$4,265,000 against \$2,750,000.

**Monsanto Chemical Co.,** St. Louis, Mo. Initial quarter, 1951: net income, \$6,213,737, equal to \$1.25 a common share, against \$5,521,857, or \$1.20 a share, in last years' quarter.

**Monroe Auto Equipment Co.,** Monroe, Mich. Second half, 1950: net profit, \$256,817, equal to 57¢ a common share, against \$196,637, or 41¢ a share, in the last half of 1949; net sales, \$7,435,584, against \$5,732,519.

**The Mohawk Rubber Co.,** Akron, O. For 1950: net profit, \$596,097, equal to \$4.21 a share, compared with \$296,375, or \$2.09 a share, in 1949; sales, \$11,551,554 (a record), against \$8,359,894; current assets, \$4,565,120, current liabilities, \$1,679,645, against \$3,209,191 and \$298,595, respectively, on December 31, 1949.

**Minnesota Mining & Mfg. Co.,** St. Paul, Minn. For 1950: net profit, \$20,318,904, a new high and equal to \$10.05 a common share, contrasted with \$14,352,081, or \$8.60 a share, the year before; net sales, \$152,806,313, another record, against \$114,925,274; income taxes, \$21,200,000, against \$10,125,000; current assets, \$87,043,584, current liabilities, \$32,857,623, against \$62,951,028 and \$17,837,778, respectively, on December 31, 1949.

**Mansfield Tire & Rubber Co.,** Mansfield, O. For 1950: net income, \$2,525,487, equal to \$15.49 a common share, contrasted with net loss of \$420,608 in the preceding year; net sales, \$47,400,804, against \$24,280,882.

**General Electric Co.,** Schenectady, N. Y. March quarter: net income, \$34,996,395, equal to \$1.21 a common share, against \$36,858,391, or \$1.28 a share, in last year's quarter.

**Johnson & Johnson, New Brunswick, N. J.,** and domestic subsidiaries. For 1950: net profit, \$13,821,000, equal to \$6.49 a common share, contrasted with \$9,282,000, or \$4.47 a share, in the prior year; net sales, \$162,803,000, against \$134,880,000.

**Johns-Manville Corp.,** New York, N. Y. For 1950: consolidated net earnings, \$22,814,491 (a record), equal to \$7.29 each on 3,129,429 common shares, compared with \$14,368,926, or \$4.85 each, the year before; sales, \$203,272,945 (a new high), against \$162,580,782; income taxes, \$15,715,395, against \$7,880,000.

First quarter, 1951: consolidated net profit, \$6,292,995, equal to \$1.99 a common share, against \$3,928,551, or \$1.29 a share in the 1950 period; sales, \$57,654,044, against \$39,519,051; tax charges, \$5,862,311, against \$1,773,017.

**Intercontinental Rubber Co., Inc.,** and subsidiaries, New York, N. Y. Year ended December 31, 1950: net income, \$73,678, equal to 12¢ each on 595,832 capital shares, contrasted with net loss of \$627,506 the year before; sales, \$697,229, against \$71,343.

**Hewitt-Robins, Inc.,** Buffalo, N. Y., and wholly owned subsidiary. For 1950: net earnings, \$1,266,929, equal to \$4.55 each on 278,714 capital shares, compared with \$628,765, or \$2.25 a share, the year before; net sales, \$23,451,792, against \$19,792,292; federal income taxes, \$969,486, against \$373,200; current assets, \$10,918,430, current liabilities, \$4,062,321, against \$8,684,504 and \$2,310,713, respectively, on December 31, 1949.

**Goodyear Tire & Rubber Co. of Canada, Ltd.,** New Toronto, Ont., and subsidiaries. For 1950: net profit, \$2,146,225, equal to \$7.14 each on 257,260 common shares, against \$1,523,965, or \$4.71 a share, in the previous year.

**General Motors Corp.,** New York, N. Y., and consolidated subsidiaries. Year ended December 31, 1950: net earnings, \$834,044,039 (a new high), equal to \$9.35 a common share, contrasted with \$656,434,232, or \$7.32 a share, the year before; net sales, \$7,531,086,846 (another record), against \$5,700,835,141.

**General Cable Corp.,** New York, N. Y. For 1950: net income, \$3,354,673, equal to \$1.36 each on 1,917,646 common shares, compared with \$1,555,857, or 42¢ a share, in 1949; federal income taxes, \$2,000,000, against \$740,000; current assets, \$27,366,007, current liabilities, \$13,827,004, against \$20,860,394 and \$7,687,738, respectively on December 31, 1949.

**Flintkote Co.,** New York, N. Y., and subsidiaries. First quarter, 1951: net income, \$1,407,821, equal to \$1.06 a common share, against \$961,929, or 70¢ a share, in last year's period; net sales, \$19,763,335, against \$14,090,305.

**DeVilbiss Co.,** Toledo, O., and wholly owned subsidiary. For 1950: net earnings, \$1,195,430, equal to \$3.98 a share, against \$585,093, or \$1.95 a share, a year earlier; net sales, \$15,087,145, against \$12,715,503. (Continued on page 244)



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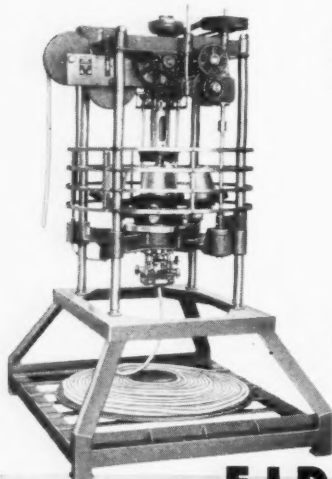
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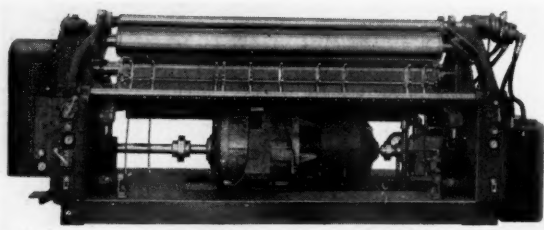
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A NEW 4 1/2-inch dial thermometer of the mercury actuated type has been announced by Palmer Thermometers, Inc., Cincinnati 12, O. These thermometers feature a case that can be rotated to any readable position while the stem is at any angle. The case is fully compensated for ambient temperatures; has a heavy all-glass cover gasket-sealed to the steel back plate; is dust-, vapor-, and water-proof; and has a durable, non-corrosive finish. The dial has a non-reflecting, evenly graduated white face with an adjustable black pointer. Thermometers are



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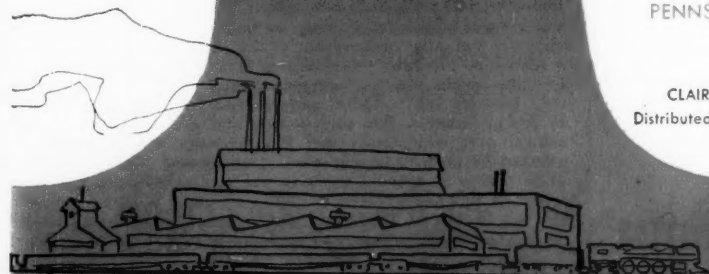
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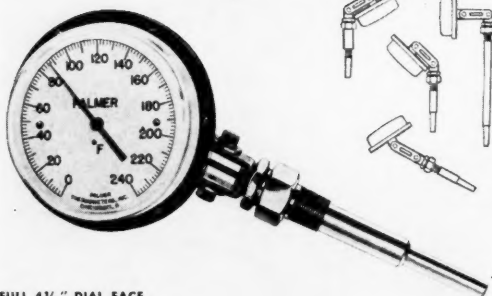
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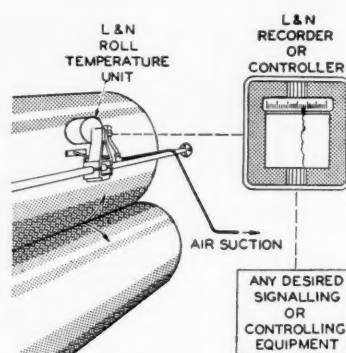
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## Roll Surface Temperature Unit

A NEW roll surface temperature unit that measures the temperature of a moving roll surface without touching the roll has been developed by Leeds & Northrup Co., Philadelphia, Pa. Because of its design, the new unit cannot scratch, score, or in any way destroy delicate surface films. It is claimed, and the temperature detected

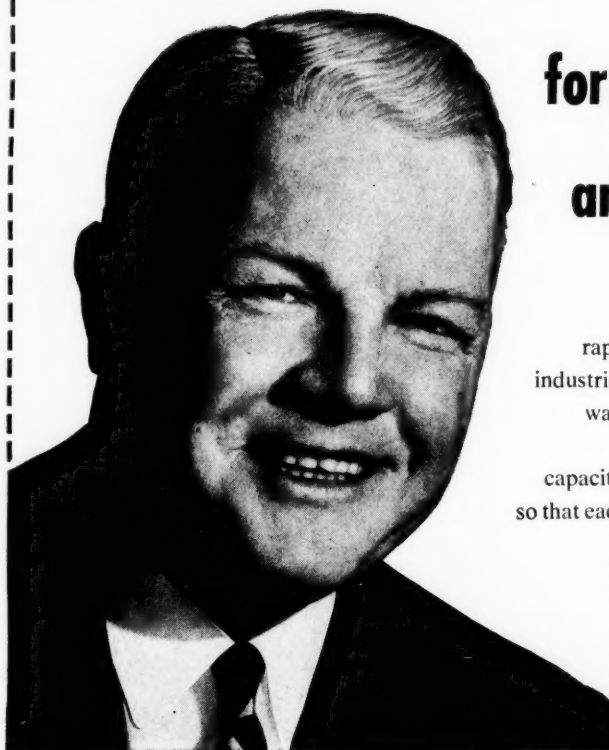


**Diagram of Leeds & Northrup's Roll Surface Temperature Unit in Use**

can be recorded automatically by either an L & N Micromax or Speedomax instrument supplied as an integral part of the complete equipment. The recorder can also be equipped to operate signals or controls.

Applicable to roll diameters down to nine inches and to flat surfaces, the new temperature unit operates independently of surface speed, emission characteristics, and finish. It can be mounted at the center of the roll or at any other location. The new development works on the principle that a moving object carries with it a thin, closely adhering layer of air at nearly the same temperature as the moving surface. The measuring head, contoured to fit the roll, is mounted  $1/32$ -inch from the surface, and a continuous stream of air sucked past the head heats it to virtually the same temperature as the roll surface.

Although recorded temperatures is a few degrees ( $4^{\circ}$  F. or less) below the true surface temperature of the roll, the difference remains substantially constant and is, therefore, negligible in process control. Air suction rate and surface speed are non-critical over wide limits, and measurements are not appreciably affected by ambient temperature. A compound joint with spacing slide makes it easy to position the measuring head concentric with the roll and at proper spacing. Should material adhere to the roll surface, a safety bumper retracts the measuring head to avoid damage. The unit can be supplied with a safety switch to operate in conjunction with this retracting device, and actuate a bell, horn, or light to signal the operator, and also freeze the control until the measuring head is reset.



for *extra* capacity  
and *extra* precision!

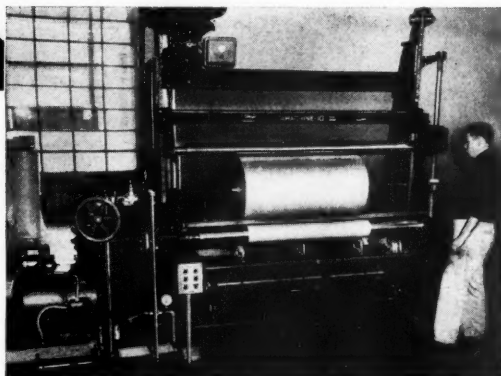
"EVERYONE KNOWS that production problems are rapidly mounting in the paper making and printing industries. Now, more than ever before, we can't afford to waste either time or materials. The recent addition of new equipment to our plant provides that *extra* capacity which is needed to keep a step ahead of the pace—so that each job can be handled with *extra* care to avoid waste."

**Mr. Arthur G. Nelson, President**  
A. G. Nelson Paper Co., Inc., New York, N. Y.

**NELSON's** reputation has been built through more than thirty years of service in supplying accurately rewound paper rolls and sheets for the printing industry of Metropolitan New York. The A. G. Nelson plant, completely equipped with modern slitting, rewinding and sheeting equipment, also serves as a finishing room for paper mills.

High-speed web-fed printing presses call for absolutely true slitting and rewinding to assure the uniform web tension which minimizes web breaks, and to provide more accurate lengthwise and sidewise register on the travelling web. Because they are backed by more than thirty years of know-how in roll production it is not surprising to find the A. G. Nelson Company plant equipped exclusively with *Camachine* slitters and rewinders.

Over the years *Camachine* has proved to be the one outstanding name in roll production equipment . . . for rubber, textiles, plastics and other materials, as



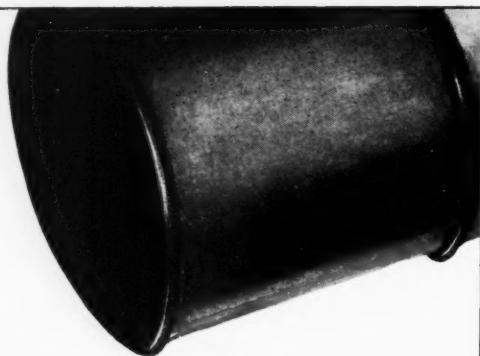
The *Camachine* Type 10 Model 04 slitter rewinder recently installed at A. G. Nelson Company is equipped with: *Camachine* 1B-PMR pneumatic mill-roll stand; electric riding roll lift; and *Pneucut*® patented pneumatic slitter units. Handles 72" rolls at 2000 feet per minute. Rewound diameters to 40".

\*Trade name reg. U. S. Pat. Off.

well as for paper and paper board. No matter what material you produce or convert in roll form, it will pay you to consult with *Camachine* engineers regarding faster production and improved roll quality.

**Cameron Machine Co., 61 Poplar St., Brooklyn 2, N.Y.**

*They can depend on* **Camachine®**



**THESE  
CAN'T  
BE  
SUCCESSFULLY  
IMITATED!**

**You get better heat-light protection with Advance RESIN STABILIZERS. And experienced plastics men know they can't be successfully imitated!**

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# EUROPE

## NETHERLANDS

### '49 Report from the Rubber Foundation

The thirteenth report of the Rubber Foundation at Delft surveys its progress in 1949. In the research department Dr. Boonstra began an extensive new research program on the influence of different kinds of carbon black on the mechanical and chemical properties of rubber mixes. New advances have been made in the preparation and the use of rubber hydrochloride, details of some of which cannot as yet be revealed, for instance, about the process being developed for producing profiles and shaped objects from this material. Rubber hydrochloride has given excellent results in laboratory tests as a coating on metal surfaces.

The methods in use at the Foundation to prepare chlorinated rubber from latex have definitely been found to yield a product that is different from and in many respects better than traditional material made from solution. The problems connected with the preparation of stable emulsions from chlorinated rubber have to some extent been solved, and the application of these emulsions is being investigated. We note, in connection with analytical investigations, that it has been found possible to detect differences in the spectra of various types of chlorinated rubber subjected to infrared analysis.

The method of determination of oxygen with the aid of  $I_2O_5$  has been further elaborated; fluorine in the presence of chlorine can best be determined by decomposition of the compound with potassium and precipitation of KF with PbCl. X-ray investigations were continued on neoprene and begun on polyethylene and rubber hydrochloride.

In the technological investigation on latex under Dr. Kraay, further progress was made in the flow-casting process; an ebonite was obtained with mechanical properties intermediate between those of Bakelite and normal ebonite. This development provides an attractive method for making complicated objects of ebonite.

In the asphalt laboratory, a material suitable as a filler for joints was prepared by the addition of ground rubber and rubber hydrochloride to certain asphalt-bitumens.

The development department reports widespread interest in 1949 in rubber-asphalt roads. Requests for trial consignments of rubber powder were received from Scandinavia, Finland, Germany, Switzerland, Austria, Venezuela, Brazil, Iceland, India, and England. The experimental factory at Bogor, Java, where Mealarub is produced, was extended to make 100 tons of the material a month during 1950. Production of the similar material, Pulvatex, which ceased owing to destruction of the plant in Java, was scheduled to be resumed in Holland.

Manufacture and application of Positex was to have been started by a Netherlands firm in Holland.

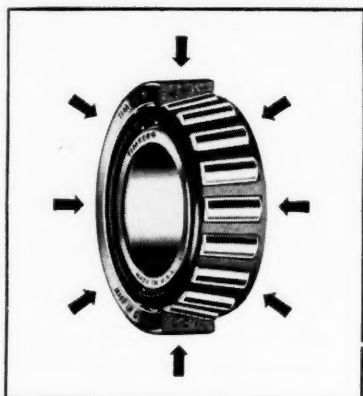
The Netherlands Railway agreed to make trials with foam rubber in the new stream-lined electric carriages.

The formation of another branch of the Rubber Foundation of Delft, this time in Switzerland, has been announced. The Swiss Rubber Bureau, as it is called, has its headquarters in Zurich and is under the direction of E. Leeman.

### Rubber Bags in Suction Dredging

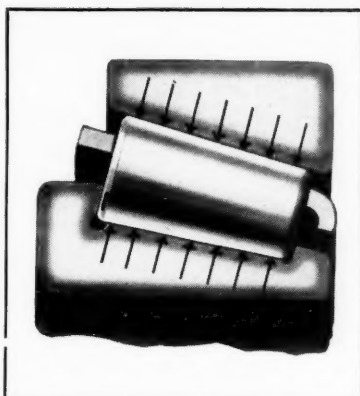
A recent issue of *Rubber*,<sup>1</sup> publication of the Rubber Foundation describes suction and compression bags for use in connection with suction dredging. The compression bags are intended to form flexible connection between the separate sections of the floating and land conveyers for the sand drawn up by the machine, and the suction bags give flexibility at the point where the suction pipe joins the suction device. The bags are made of rubber with three or four plies of canvas inserted; the inner rubber wall is about 10 millimeters thick and the outside wall, three millimeters thick; the overall thickness of the walls of the bags is 25 millimeters. To prevent collapse, the suction bags are reinforced with iron rings. Both suction and compression bags are made with wide sleeves to be slipped over the ends of the pipes, and each sleeve is provided with leather lugs to facilitate their mountings. Clamps hold the bags firmly in place.

<sup>1</sup>Dec., 1950, p. 135.



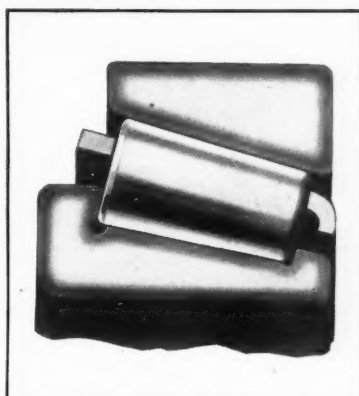
#### TAPERED CONSTRUCTION

Because Timken® roller bearings are tapered in design, they carry *both* radial and thrust loads. Shafts are held in alignment, auxiliary thrust bearings eliminated, easy adjustment permitted.



#### LINE CONTACT

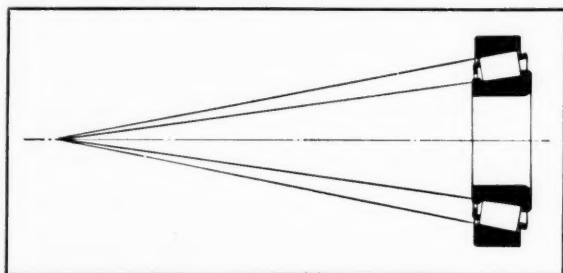
In Timken bearings, the load on the rollers and races is spread evenly over a *line* of contact. Because the load area is greater, Timken bearings offer extra load-carrying capacity.



#### HARD SURFACE, TOUGH CORE

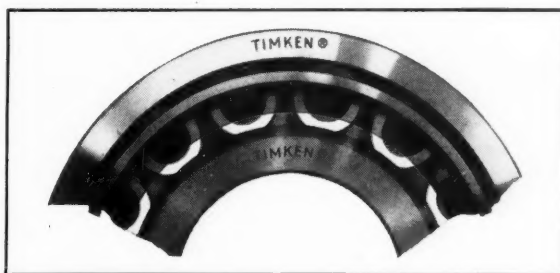
Made of Timken fine alloy steel, rollers and races of Timken tapered roller bearings are case-carburized, resulting in a hard, wear-resistant surface and a tough, shock-resistant core.

## To get all this, get **TIMKEN® bearings!**



#### TRUE ROLLING MOTION

Since rollers and races of Timken bearings are tapered so that all lines coincident with their tapered surfaces always meet at a common point on the axis of the bearing, the rollers roll smoothly, frictionlessly. Wear is minimized, precision lasts longer. It's another big advantage you get in Timken bearings.



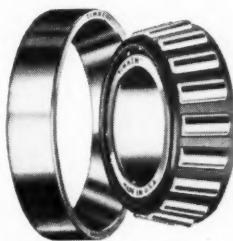
#### POSITIVE ROLLER ALIGNMENT

Wide area contact between roller ends and rib of the cone insures positive alignment of the rollers in Timken bearings—more precision, less friction, longer wear. Be sure the bearings you buy carry the trademark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

# TIMKEN

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## Ozuriet Cables for Heating

The use of Ozuriet cables for heating buildings is discussed in the December, 1950, issue of *Rubber*. Ozuriet, a product developed by the Hollandsche Draad en Kabelfabriek of Amsterdam, is a mixture of degraded natural rubber, sulfur, fillers, and accelerators, which is claimed to age much more slowly than ordinary rubber and moreover has good resistance to chemicals. It was originally intended for use as chemically resistant linings for tanks, caustic baths, piping, metal chimneys, etc. It was found, however, to have very good electrical insulating properties and to withstand high temperatures so that it was soon also used for insulating special types of cables. One type has come into use for heating the soil in hot houses, and the like; for heating the air in storage places to prevent freezing at night of fruit, vegetables, potted plants, seed potatoes, kept through the fall and winter months. The latest application seems to be for heating dwellings, stores, churches, and other buildings. The cables are suitably installed in floors, walls, and ceilings to provide uniformly distributed heat. Various office buildings and churches have already been equipped with Ozuriet cables, apparently with satisfactory results.

## Rubber Footwear Industry

In the first nine months of 1950, 3,749,000 pairs of rubber footwear were produced by firms employing 25 or more persons, a quantity estimated to be about 90% of the total output, official Dutch sources report. At the same time exports came to 230,262 pairs, a substantial gain of 88.7% over the figures for the corresponding period of 1949. Imports totaled 162,396 pairs. The figures do not include footwear with cloth uppers or leather soles.

## GREAT BRITAIN

### Against Current Rubber Prices

A provocative article on present rubber prices, which is calculated to have consequences if it represents the feeling of any considerable portion of those connected with the British rubber industry, appeared in the February, 1951, issue of the *Rubber Age* under the title, "The Strangeness of Truth," with the subtitle, "The Lady Doth Protest Too Much—Hamlet." We cannot do better than quote from it:

"This Journal has never hidden its opinion that it was the maladroit policies of . . . a small handful of professional men in London . . . that led to the present state of affairs whereby rubber has become scarce and its price exorbitant. It has become obvious that these men have lost control of the commodity and are becoming seriously frightened at the pass to which they have brought rubber and thereby the rubber manufacturing industry . . .

"They know perfectly well if rubber continues to rise at the present rate, the rubber manufacturing industry will either have to find a substitute for crude rubber . . . or go out of business . . .

"We invite trade unionists and their leaders to investigate the matter . . .

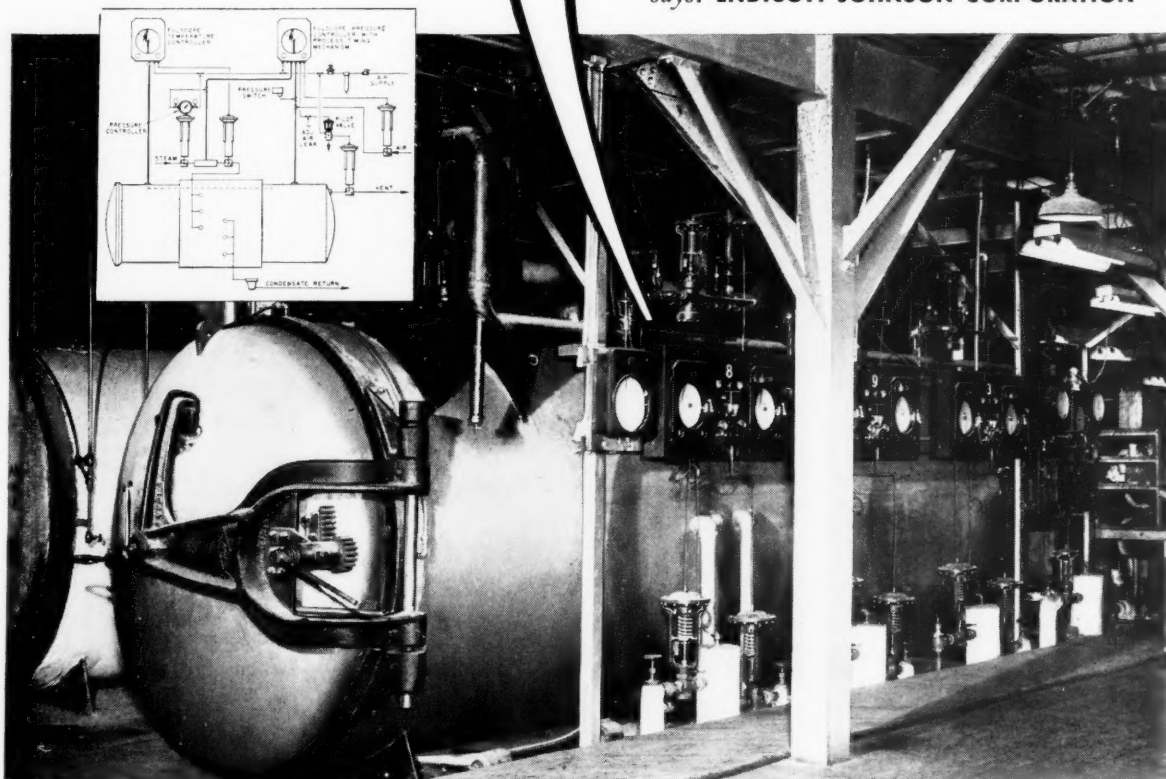
"That a Government enquiry similar to that held in the U.S.A. by Senator Truman in 1942 is feared, is apparent from the form the grower's propaganda is taking . . . that rubber has risen less in proportion to its pre-war price than other commodities. No greater mistake was ever made and it should not be allowed to disguise the guilt of its authors.

"When the first announcement appeared with what purported to be comparison of the price indices of various commodities, we noted that (for rubber) . . . the basis was on 1939 prices. The Rubber Regulation Scheme had then been in operation for five years and by means of restriction the price had been forced up from 2 5/16d. per lb. and 3 7/32d. per lb. . . . the average yearly prices in the two years immediately preceding restriction, to an average of 7 7/32d. for 1938 and 8 5/32d. for that part of 1939 that preceded the war.

"Taking 1939 rubber index as 100, it is made to appear that for the first ten months of 1950, the index rose to 196.1, corresponding to 17.4d., while in the month of October the index rose to 356.3, corresponding to 31.6d. . . .

# We really get UNIFORM CURES

says: ENDICOTT JOHNSON CORPORATION



*Taylor-controlled boot and shoe vulcanizer at Endicott Johnson's, Johnson City, N. Y., plant.*



**T**HIS battery of Buflovak boot and shoe vulcanizers (two shown) at Endicott Johnson's big Johnson City, N. Y., plant, are turning out a uniform product, time after time—under Taylor

Automatic Vulcanizer Control. Each of those panels (center) controls one vulcanizer.

**Here's what happens:** Fabric and rubber are put on the lasts—then into the vulcanizer. Then Taylor automatic control takes over. A Limited Range Taylor FULSCOPE\* Controller controls temperature of steam to heating coils. A FULSCOPE Controller with Process Timer automatically controls the air pressure inside

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the vulcanizer, to make the uncured product conform to the last. Masterminded by the Process Timer, this Taylor control system automatically times the vulcanizing cycle, shuts off the air, and vents the vulcanizer.

**For most any product** you are making or want to make—we can supply you with a dependable, low-cost control system. To save money while you maintain uniform quality, ask your Taylor Field Engineer! Or write Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

*Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.*

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Strong Color on the Orange Side

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"The following is the true position, with pre-war 1939 prices as the basis:

	First Ten Months		Oct., 1950	Nov., 1950
Index	1939	1950	592	700
Actual price per lb.	8s. 5/8d.	1s. 10+d.	4s. 3 5/8d.	5s. 1 21/32d.

"We might have thought they (the propagandists) had made a mistake had they given the actual figures on which they based their index . . . None of them did so.

"We have already pointed out that 1939 was an unfair year for a pre-war comparison. . . . The only fair comparison would . . . be the last free production year, 1933, i.e., with free world prices for all commodities and investigation into that year and comparison with 1950 reveals the true story of rubber . . .

"The average price of rubber for the year 1933 was 3 7/32d. The average price for English wheat for 1933 . . . 4/8d. per cwt. This produces the following:

	Rubber		Wheat	
	1933	Nov., 1950	1933	Nov., 1950
Index	100	1930	100	600
Actual	3 7/32d. per lb.	5s. 1 21/32d. per lb.	4s. 8d. per cwt.	28s. per cwt.

"Whatever rubber propagandists may say to the contrary, rubber has been increased in price twenty times its pre-war free market level as against an average of six times for other commodities, and alone amongst the larger rubber manufacturing countries, Great Britain has to bear the full brunt of the rise. U.S.A. was already using 400,000 tons per annum of synthetic when the rises started . . . U.S. manufacturers were paying 18½ cents a pound for synthetic. It has risen to over 20 cents. We face a permanent prospect of 5s. natural rubber.

"Surely this is a time when workers and management of rubber plants should write and ask the Government to take over the rubber growing industry, or alternatively to erect synthetic plants in Great Britain."

In connection with the above it is interesting to quote once more, this time a question put by a member of Parliament to the Secretary of State for Colonies in the House of Commons in February.

"Will the right hon. gentleman agree that the abnormal price of rubber to-day is, first of all, due to American stockpiling; and secondly that the price on the London market to-day is because of the dock strike in the Mersey?"

## FRANCE

### Heat Sensitization of Hevea Latex

In the course of work on the heat sensitization of *Hevea* latex, in which a solution of a zinc ammonium complex was added to the latex, it was observed by P. Cassagne<sup>1</sup> that zinc ammonium acetate has a much greater heat-sensitizing effect than zinc ammonium sulfate. Since acetic acid is a weak acid, the difference in behavior could not be referred to a greater ionic strength. An investigation was therefore undertaken to discover whether other complex salts of weak acids were capable of providing new heat-sensitizers. First it was found that the difference in behavior noted above was due largely to hydrolysis; the easily hydrolyzable zinc acetate precipitates more rapidly in the presence of increasing amounts of ammonia than does zinc sulfate, and addition of excess ammonia causes the hydroxide to redissolve more rapidly, so that for the same molarity of zinc salt and ammonia, a larger amount of complex ion is formed with the acetate than with the sulfate.

Further tests were carried out on other organic acids, including saturated, unsaturated, and amino acids. In addition to the acetate, the zinc ammonium formate also proved to have high heat-sensitizing power. The activity of the fatty acids was found to depend on the length of the chain and the degree of unsaturation; activity decreased with increasing molecular weight in the aliphatic series, and only unsaturated fatty acids appeared capable of yielding active complexes. Thus complexes formed from undecylenic acid were 15 times more active than those from undecylic; a similar situation was observed in the case of zinc ammonium oleate as compared with zinc ammonium stearate.

Of the amino acids, only the dicarboxylic acids are capable of forming, complex ions and heat-sensitizing latex.

<sup>1</sup> Rev. gén. caoutchouc, 28, 1, 39 (1951); 2, 105.

# **NOW AVAILABLE—New Witco Bulletin on M. R. Hard Hydrocarbon**

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**SECTION II** covers the use of M. R. #38 in GR-S compounds . . . such as automotive tire treads, smooth tubing channel compounds, garden hose tube compounds, high durometer materials, molded slab shoe soles, and ignition cable insulation.

**SECTION III** describes hard hydrocarbon test procedures, rubber mixing procedures, and rubber test procedures.

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These studies indicated that actually the range of effective heat sensitizers of the zinc ammonium complex ion type is limited to very few including the formate and acetate, which are recommended for use in the manufacture of solid molded articles, and the undecylenate and oleate for spongy molded goods; because of their surface active properties they can act as foaming and heat-coagulating agents at the same time. The stearate is often used, but is much less effective.

Further studies were devoted to the amino acids in the serum of the latex. It was found that the heat sensitivity of a latex which is naturally or biochemically degraded is largely due to the presence of the diamino acids liberated by the decomposition of the proteins. These acids alone are capable of forming zinc ammonium complexes; the monoacids react only with excessively degraded latex. The nature and the proportion of the amino acids in the serum determine the solubility of the zinc oxide; this solubility could be measured directly in the latex by means of polarographic analysis.

A question still to be solved is whether coagulation takes place by simple neutralization of the negative particle of the rubber by the zinc ammonium cation, or whether, as certain Dutch chemists believe, it is the zinc hydroxide formed by the dilution of the complex which acts under a special colloidal condition.

## Rubber Trade Notes

Patent rights to a process for the fusion of hide and latex, as contrasted with processes for filling in leather with latex or putting a layer of latex on top of the leather, are being offered for sale by a French chemical engineer and inventor.<sup>1</sup> Various advantages are claimed as increased yield (the sole leather obtained is equivalent to 85% of the weight of the raw hide used, as compared with the usual 62%); increased thickness of the finished product, which permits the use of even light cowhides for sole leather; reduction of tanning time to one month; increased wear resistance and adequate respiration (the latex treated leather breathes as well as ordinary leather.)

The strikes in the French tire industry last spring caused a considerable setback in output. Official figures reveal that production amounted to 68,254 tons in the first nine months of 1950, as against 93,400 tons in the corresponding period of 1949. Imports increased to 6,500 tons, against 3,500 tons; while exports fell from 17,620 tons in the 1949 period to 12,150 in 1950.

Foreign press reports suggest that the price of French tires are about to be raised; an average increase of 17% has been mentioned.

France, like the United Kingdom, had hitherto displayed little interest in producing her own supplies of synthetic rubber and has imported, chiefly from the United States, the small amount of synthetic required by local industry. Now it appears the possibility of utilizing the large amounts of alcohol available in France for the production of synthetic rubber is being seriously considered. Appropriate government departments are said to be studying blueprints for synthetic rubber plants.

<sup>1</sup> Foreign Commerce Weekly, Jan. 29, 1951, p. 7.



**Cut Trouble?**

SEE PAGE 132

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why be satisfied  
with anything but  
"Better than the best"  
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or GR-S stocks?

# ANTIOXIDANT 2246

is the most active non-staining, non-discoloring antioxidant yet developed. Its activity results in the lowest net cost. Ask the man who has used it.

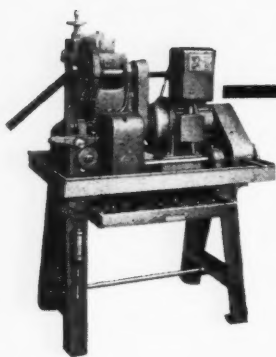
Specify the incorporation of Antioxidant 2246 when you place your orders for non-staining GR-S stocks through the Office of Rubber Reserve.



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**T**HE Thropp Automatic Washer Cutter does not require mandrels. It will cut washers for hose connections, bottle stoppers, plumbers' washers, synthetics, uncured stock for molds, etc. A single unskilled operator can run one or more of these machines at the same time. Size of Cuts:  $\frac{1}{4}$ " in diameter to  $1\frac{3}{4}$ " inclusive, and from 3/32" to  $1\frac{1}{2}$ " in length.

Capacity: 100 cuts per minute on long lengths and big diameters; and 200 cuts per minute on narrow widths and small diameters.

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## Editor's Book Table

### BOOK REVIEWS

"Indentation Hardness Testing." Vincent E. Lysaght. Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y. Cloth, 6 by 9 inches, 290 pages. Price \$6.

This book combines both theoretical and practical aspects involved in the problem of hardness testing metals and other materials. Instruments in common use are described in detail, as are those used for specialized types of hardness tests. The advantages and disadvantages of each instrument and testing method are discussed and compared, specifications given, and recent work described.

Instruments covered include the Brinell, scleroscope, Rockwell standard and superficial testers, Vickers, and other portable and non-portable testers. Other sections are devoted to hardness concepts, hardness conversion relations, applicability of hardness tests, tests on sheet metal and cylindrical surfaces, hot hardness testing, microhardness testing of metals, and indentation hardness testing of non-metallic materials.

The section on non-metallics describes the use of Rockwell, Brinell scleroscope, Vickers, Knoop, and Tukon testers with plastics, the problems peculiar to plastics, and the relation of hardness to scratch resistance and other properties. A brief mention is also made of the durometer and plastometer hardness testing of rubber. Tables of hardness numbers, conversion tables, test specifications, and hardness values are included in the book, together with a subject index and bibliography references.

"Dynamic Motion and Time Study." James J. Gillespie. Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y. Cloth,  $5\frac{1}{2}$  x  $8\frac{1}{2}$  inches, 148 pages. Price, \$3.75.

This book presents a new approach to the study of motion and time in that work activity is related to work psychology. The author states that motion study has become micromotionism and with its intricate equipment and phraseology has become a complex, unwieldy technique completely divorced from practical, humanitarian knowledge. Operator efficiency cannot be determined on the basis of minimum motion, but must take into account the psychological and physical reaction of the individual.

The author sets up new principles of dynamic motion study wherein time is seen as a measure of rhythm, and the shortest and fastest motion is not necessarily the best motion. The new system, as set forth in simple and understandable style, takes into account the reaction of the operator physically, emotionally, and mentally and does allow for some free expression in the work situation to maintain operator interest.

Individual chapters cover the study of human motion; statement of principles; the job whole; the motion observer, the operator, and the group; operator study; motion rhythm and harmony; scientific and other methods; physical job analysis; body posture and motion; dynamic symbolism; task speed and effort, and the rating fallacy; operation study; relaxation and other allowances; practical application of motion study; and work psychology and motion and time study. Many illustrations are used to clarify the text, and a list of literature references and a subject index are appended to the book.

"Industrial Research Laboratories of the United States." Ninth Edition, 1950. Compiled by Myron J. Rand. Published by National Research Council, National Academy of Sciences, Washington, D. C. Cloth,  $6\frac{1}{2}$  by 10 inches, 450 pages. Price \$5.

A measure of the growth of industrial research in the United States is found in this ninth edition of the National Research Council's directory, "Industrial Research in the United States." In the gathering of material for this edition between January and June, 1950, explanatory letters and information forms were sent to about 7,000 companies, including the 2,443 in the eighth edition. Of these latter, all but about 300 reported continued research activity; the book contains no unrevised information. Of the 4,500 organization not represented in the eighth edition, 3,000 replied, and about 750 previously unreported research laboratories were found.

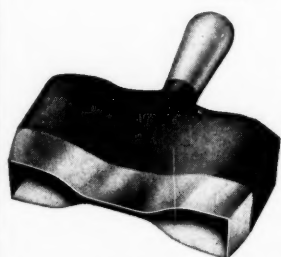
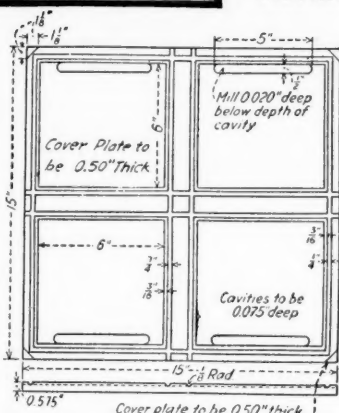
In some cases many almost independent laboratories are grouped under a single company head so that actually the number of industrial laboratories might be considered greater than the number listed. As in previous editions, the president, research director, and assistants are listed for each company.

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The appendix contains a listing of federal government laboratories and also a listing of university and college laboratories that provide services to industry. Included also is a geographical distribution of laboratories and a subject index to research activities.

## NEW PUBLICATIONS

**"R. D. Wood Company."** R. D. Wood Co., Independence Sq., Philadelphia 5, Pa. 32 pages. This photographic booklet describes and illustrates some of the firm's production divisions, covering facilities, methods, and equipment used for the manufacture of hydraulic presses, valves, and allied equipment. Operations involved include the work of the engineers, patternmakers, foundrymen, machinists, and assembly, testing, and shipping personnel.

**"Vinylite Vinyl Acetate Resins — Technical Data."** Bakelite Division, Union Carbide & Carbon Corp., 122 E. 42nd St., New York 17, N. Y. 20 pages. This booklet on the company's vinyl acetate resins and dispersions and vinyl alcohol-acetate resins gives extensive data on their properties, applications, compounding, and bonding. Much of the data appears in graphic and tabular form, and the information on compounding presents actual formulations for use in specific applications.

**"Stan-Tone MBS Colors."** Bulletin #02-14-0-3-51. Harwick Standard Chemical Co., 60 S. Seiberling St., Akron 5, O. 3 pages. This bulletin describes the series of Stan-Tone Masterbatch Colors wherein the coloring pigments are dispersed in a plasticized resin. Compositions and properties are tabulated for the more popular colors, and information is given on shipping containers.

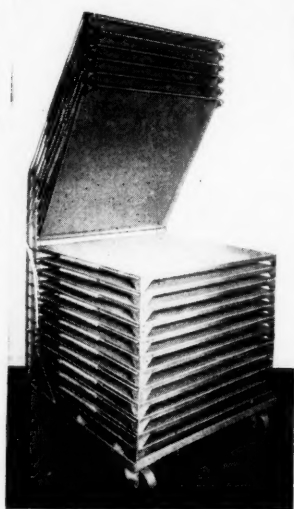
**"Baldwin Steam Platen Presses."** Bulletin No. 290. Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa. 20 pages. This illustrated bulletin describes both standard and typical custom-built steam platen presses made by the company. Standard presses range from 100-12,750 tons in capacities; while special presses are made to order for molding belting, brake lining, belting, drug sundries, askets and packings, etc.

**"G-E Thermosetting Molding Powders Which Conform to Military Specification Mil-P-14A."** General Electric Co., Pittsfield, Mass. 38 pages. This pocket-size booklet describes 31 molding powders made by the company that meet the requirements of Specification Mil-P-14A. For each powder are given the specification grade it meets, a general description, and both powder and molded properties.

**"Work Gloves Impregnated with Plastic for Greater Wear and Greater Safety."** American Rubberizing Co., Minneapolis 4, Minn. 4 pages. This folder describes and illustrates the company's industrial work gloves and children's play gloves made by dip coating fabric into vinyl plastic.

**"Tlurgi Yearbook, 1951."** The Los Angeles Rubber Group, Inc., Mayfair Hotel, Los Angeles 14, Calif. Volume X. 80 pages. Following the format of previous editions, this yearbook lists the Group's officers, directors, and committeemen; describes the work of the committees; reviews the social and technical aspects of meetings held during 1950; lists the Group's membership; gives a tabulation of Pacific Coast rubber manufacturers and suppliers; and gives the Group's by-laws. The technical section includes tabulations of elastomer to metal adhesives, rubber solvents, rubber reinforcing resins, and available carbon blacks.

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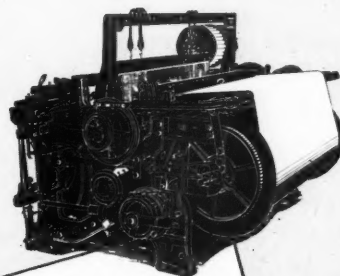
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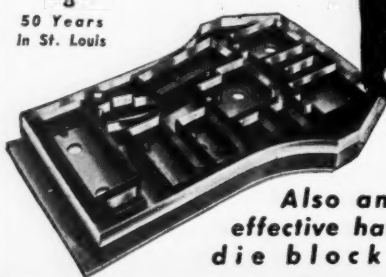
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"Neoprene Notebook." No. 47. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. 8 pages. This issue of the Notebook contains stories on the use of neoprene to resist seizure to metal surfaces under high pressure and temperatures; neoprene-treated paper slip covers for barrels and drums in storage; neoprene water-stops for sealing concrete slabs and joints; neoprene covered rolls in tin plate production; and liquid neoprene compositions for protecting plastic laminates used in non-structural aircraft parts.

"Neoprene Latex Type 735." H. H. Abernathy, R. W. Walsh, J. R. Galloway, and W. W. Pockman. Report No. 51-1, January, 1951. 16 pages. Full details are given on the properties, compounding, and application of Neoprene Latex Type 735, an aqueous dispersion of a special type of polymerized chloroprene especially designed for addition to paper pulp. Other uses include blending with other neoprene latices in dipped goods, adhesives, and foam compounds.

"Emery Dimer Acid." Emery Industries, Inc., Carew Tower, Cincinnati 2, O. 20 pages. Information is given on the properties, shipping, handling, and potential applications of Emery 955 Dimer Acid (dilinoleic acid). Data are included on its use in bodied oils, varnishes, and alkyd resins, and bibliography of 51 references is appended to the booklet.

"Rubber Adhesives for All Industrial Purposes." Rubber & Asbestos Corp., Bloomfield, N. J. 8 pages. This booklet presents an extensive tabulation of the company's adhesives, giving data on uses, characteristics, composition, properties, etc. Also included are information on containers, the selection of adhesives, and the company's equipment and services.

"Hercules Resins for Adhesives." Hercules Powder Co., Inc., Wilmington, Del. 18 pages. Extensive information and test data appear in this booklet on the effect of the company's resins in improving the film cohesion, surface tack, bond strength, and other properties of rubber, cellulose, and water soluble adhesives. Much of the data covers rubber base, solvent, and latex adhesives and includes information of stability, particle size, pH control, bonding pressures, etc.

"Fire Hose and General Industrial Hose." New York Belting & Packing Co., Passaic, N. J. 16 pages. This illustrated catalog contains engineering data, specifications, and other information designed to aid engineers in the selection and care of hose. Types of general hose covered include dust conveying, blower, sand blast, sprayer, and others.

"ASTM Manual on Quality Control of Materials." Special Technical Publication 15-C. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. 140 pages. Price, \$1.75. This new manual has been prepared by Committee E-11 on Quality Control of Materials to replace the previously issued "ASTM Manual on Presentation of Data." The new booklet is organized in three parts: (1) presentation of data, representing a revision of the manual being replaced; (2) limits of uncertainty of an observed average, representing a revision of Supplement A in the old manual; and (3) control chart method of analysis and presentation of data, with applicable formulae tables, and examples.

"Staflex QMXX." Deecy Products Co., Cambridge 42, Mass. 1 page. This data sheet outlines the advantages of Staflex QMXX as a stabilizer for vinyl resins and gives information on its compounding and use in such resin formulations.

"Your Social Security Benefits." 1950-1951 Edition. Commodity Research Bureau, Inc., 82 Beaver St., New York 5, N. Y. 32 pages. "Grand Central Palace Presents a New Package Plan for Trade Shows and Conventions." Grand Central Palace, Lexington Ave., 46th to 47th Sts., New York, N. Y. 4 pages. "1951 B. F. Goodrich Baseball Guide." The B. F. Goodrich Co., Akron, O. 36 pages. "R.I.P." The Travelers Insurance Cos., Hartford, Conn. 32 pages. Publications of Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago 11, Ill. "List of Inspected Fire Protection Equipment and Materials." January, 1951. 221 pages. "Bi-Monthly Supplement to All Lists of Inspected Appliances, Equipment, Materials." February, 1951. 86 pages. "Index of Military Purchasing Offices. A Guide to Industry in Selling to Military Departments." Munitions Board, Pentagon, Washington 25, D. C. 16 pages.



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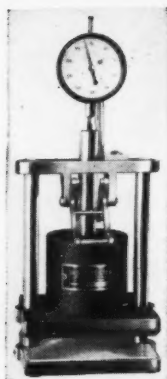
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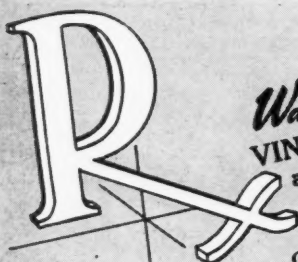
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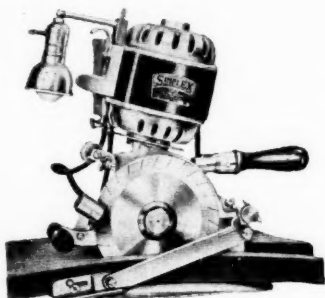


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SALES REPRESENTATIVES: Charles Larkin II, 250 Delaware Ave., Buffalo 2, N.Y.; H. L. Blachford Ltd., 977 Aqueduct St., Montreal 3, Canada; Ernesto Del Valle, Toluca 64, Mexico D.F.

# MARKET REVIEWS

## CRUDE RUBBER

### Commodity Exchange

#### WEEK-END CLOSING PRICES

Futures	Jan. 27	Feb. 24	Mar. 17	Mar. 24	Mar. 31
Mar. ....	67.00	73.00	70.00	81.00	
May. ....	63.00	68.00	64.00	65.00	67.00
July. ....	58.00	62.00	60.00	65.00	65.00
Total weekly sales, tons	410	50	80	270	90

**T**RADING in rubber futures on the Commodity Exchange during the second half of March was desultory as dealers marked time until the end of the month when trading in rubber was suspended indefinitely in accordance with the GSA order. All trading consisted of liquidations of open interest, with 380 tons sold during the second half of March to give a total for the month of 710 tons. With the suspension of trading some 280 tons still remained in the open interest and are expected to be settled by a committee appointed by the Exchange's board of governors.

### New York Outside Market

#### WEEK-END CLOSING PRICES

	Jan. 27	Feb. 24	Mar. 17	Mar. 24	Mar. 31
No. 1 R.S.S.	72.00	75.00	72.00	76.00	72.00
No. 3 R.S.S.	70.00	73.50	70.50	74.50	70.50
No. 2 Brown	61.00	63.00	61.00	65.00	62.00
Flat Bark	51.00	48.00	46.00	50.00	48.00

**T**HE New York Outside Market in physical rubber followed the trend of the futures market during the second half of March. Prices were firm during the third week of the month and then fell off to levels more in line with GSA buying prices. All trading was suspended at the end of March, and the government is now the sole purchaser of natural rubber.

Toward the middle of April there were reports that rubber prices in the foreign primary markets were declining as the result of two factors: (1) the imposition of Malayan and British export licensing systems which favor friendly nations and alleviate the competitive bidding that has kept the markets at firm levels; and (2) the announcement by GSA Administrator Jesse Larson that the nation's stockpile goals are soon to be achieved, with resultant reductions in purchasing of rubber in the foreign markets. The GSA quoted No. 1 R.S.S. at 66¢ a pound during the first half of April.

### Latices

**T**HERE is no further need to limit consumption or prohibit private importation of natural rubber latex, according to Arthur Nolan, Latex & Rubber, Inc., writing in the April issue of *Natural Rubber News*. All indications are that the nation's latex stockpile goal will be achieved easily. NPA Order M-2 restricts consumption of *Hevea* latex for civilian items

to about 4,400 tons a month for the second quarter of this year. This level represents an intolerably low amount for many users and has resulted in many appeals for relief. On the other hand some 6,500 tons or more of *Hevea* latex a month are available to domestic buyers without difficulty; so no shortage exists. There is no national security gain in restricting a product in ample supply. Mr. Nolan asserts.

The present low April-June allocations of *Hevea* latex should be revised upward in substantial amounts to alleviate the starvation diet of certain segments of the latex consuming industry. At the same time, Mr. Nolan urges the adoption of latex industry advisory group recommendation that GSA purchase and maintain latex stockpile, but that further purchases and importation of latex be returned to a free market.

The April 1 amendment to Order M-2 did not alter the restrictions previously announced for *Hevea* latex. The GSA April price for concentrated *Hevea* latex in rail tank cars remained at 84.5¢ a pound total dry solids. There has been no announcement as yet as to the price during May or June. January statistics for *Hevea* latex show imports of 7,502 long tons, dry weight; consumption, 5,178 long tons; and month-end stocks, 6,039 long tons. February estimates are: imports, 6,300 long tons; consumption, 5,300 long tons; and month-end stocks, 5,800 long tons.

Although GR-S latex production figures are not as yet available for March, a shortage of this type of latex is predicted during April and May. GR-S latex prices remain unchanged.

## RECLAIMED RUBBER

**T**HE reclaimed rubber market showed little or no change during the period from March 16 to April 15 from the market of the preceding month. The industry continued operating at top levels while awaiting the issuance of ceiling prices on reclaim. The price order was expected to be issued late in April, probably coincidental with the scrap rubber ceiling price regulation.

Final December and year, 1950, and preliminary January, 1951, statistics on the domestic reclaimed rubber industry are now available and are listed below:

	(All Figures in Long Tons)		
	1950	1951	
	December	Totals	January
Production.....	32,480	313,006	32,725
Imports.....	152	1,002	0
Consumption.....	29,905	303,733*	31,523
Exports.....	1,241	11,740	1,336
Period-end stocks..	35,708	35,708	34,409

\*Includes year-end adjustment of +278 long tons

No changes were made in reclaimed rubber prices during the period, and current quotations follow:

#### Reclaimed Rubber Prices

	Sp. Gr.	¢ per Lb.
Whole tire.....	1.18-1.20	10.00/10.75
Peel.....	1.18-1.20	nom.

Inner tube	Sp. Gr.	¢ per Lb.
Black.....	1.20-1.22	nom.
Red.....	1.20-1.22	nom.
GR-S.....	1.18-1.20	nom.
Butyl.....	1.16-1.18	nom.

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

## SCRAP RUBBER

**T**HE scrap rubber market showed only moderate activity from March 16 to April 15 in view of the impending imposition of ceiling prices by the government. Traders displayed a normal reluctance to enter into contracts until some indication is available on what the ceiling prices will be. At a meeting on March 28 representatives of the scrap rubber industry agreed with OPS officials that a tailor-made dollars and cents ceiling price regulation would be the most practical type of regulation for the industry.

Trade opinion was that the price order would be issued in the latter part of April, to take effect on May 1. The order is said to have already been cleared and to call for prices showing little variation from current market quotations. The best indication is that tire scrap prices will vary \$1-2 from existing levels; while tube prices will vary 0.5-1¢ from present quotations. Price ceilings are expected to be at mill delivered levels.

There were no changes in scrap rubber prices during the period under review. Following are dealers' selling prices for scrap rubber, in carload lots, delivered to mills at the points indicated:

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires.....	\$33.00	\$33.00
Peelings, No. 1.....	65.00	65.00
3.....	35.00	35.00
	(¢ per Lb.)	
Black inner tubes.....	11.50	11.50
Red passenger tubes.....	16.00	16.00

## RAYON

**T**OTAL rayon shipments by United States producers to domestic consumers during March were 112,200,000 pounds, an increase of 12% over the February figure. Of this total, 29,400,000 pounds were viscose and cupra textile yarn; 27,600,000 pounds, viscose high-tenacity yarn; 28,300,000 pounds, acetate filament yarn; 10,200,000 pounds, acetate staple; and 16,700,000 pounds were viscose staple.

Military requirements for rayon high-tenacity yarn are reflected in the order requiring producers to set aside 15% of their production for defense purposes. This percentage amounts to about 50,000,000 pounds a year, on the basis of estimated production. For all other types of rayon,

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**DEVELOPMENT AND PRODUCTION OPERATIONS EXECUTIVE** covering management, manufacturing, and problem solving. Experience in development of new products in fields of rubber and resin fabric coatings, plastic molding, latex proofing, and other technical and chemical applications. Excellent chemical and engineering background of 25 years' versatile experience. Prefer eastern location. Address Box No. 780, care of INDIA RUBBER WORLD.

**GRADUATE ENGINEER, 14 YEARS IN RUBBER PLANTS.** Thorough experience in compounding and all process phases of technical goods, cycle tires, tubes, hose, belts; every kind of footwear, coatings, balls. Capable complete charge of a plant. Address Box No. 781, care of INDIA RUBBER WORLD.

**MASTER MECHANIC AND PLANT ENGINEER, PRESENTLY** employed in responsible position with large chemical plant, desires change. Will relocate. Address Box No. 782, care of INDIA RUBBER WORLD.

**RUBBER CHEMIST, TWELVE YEARS' VARIED EXPERIENCE** includes development compounding on mechanical goods, factory service and lab. control. Desire position with small company in Midwest. Address Box No. 783, care of INDIA RUBBER WORLD.

**ASST. SALES MANAGER, SALES ENGINEER FOR INDUSTRIAL** molded and extruded products, graduate mechanical engineer, 17 years' rubber sales experience, 8 spent in molded goods. Broad knowledge, products, management, advertising, costs; seeks permanent position. Address Box No. 792, care of INDIA RUBBER WORLD.

**CHEMIST WITH 11 YEARS' EXPERIENCE IN MECHANICAL** goods desires responsible position in development and/or production. Experience includes development, compounding, processing, production, supervision, management, and purchasing with molded goods, extrusions, belting, and bonding mediums. Address Box No. 796, care of INDIA RUBBER WORLD.

**TECHNICAL SALES POSITION IN THE RUBBER CHEMICALS** and allied fields desired by rubber chemist with development, compounding, processing, and sales service background. Acquainted in the industry. Age 33. Address Box No. 797, care of INDIA RUBBER WORLD.

**RUBBER CHEMIST FOR PRODUCTION, TECHNICAL SERVICE** compounding and process. Eight years' tires and aircraft manufacture and research; heading 18 people, but individually capable too. 30, family, graduate; making \$6,000 base. Address Box No. 798, care of INDIA RUBBER WORLD.

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**NIGHT SUPERINTENDENT FOR RUBBER SHOE FACTORY.** Must have thorough experience in making room and capable of handling personnel. Excellent salary. WELCO SHOE CORP., Waynesville, N. C.

**ADHESIVES CHEMIST—TO WORK EXCLUSIVELY IN RESEARCH AND DEVELOPMENT** of adhesives in laboratory of progressive Midwest compounding company. Experience in natural and various latices required. Ability to work independently of prime importance. Reply in confidence giving details of academic and professional experience, salary range desired, and age. Address Box No. 790, care of INDIA RUBBER WORLD.

**WANTED: EXPERIENCED PERSONNEL QUALIFIED TO LAY OUT, SET UP, AND OPERATE** a rubber plant to make rubber-covered rolls, wrapped goods, and molded goods. Stock participation, bonus arrangement. This is a new venture with well-financed backing. Give full details of qualifications, experience, and salary desired. Address Box No. 794, care of INDIA RUBBER WORLD.

## BUSINESS OPPORTUNITIES

**OPEN TIME FOR GRINDING AND PULVERIZING OF MANY** triable plastic resins and scrap to your specifications. Phone New Haven 8-6151. ELM CITY RUBBER CO., Box 1864, New Haven, Conn.

**RUBBERIZING AND COATING WORK DESIRED. HAVE AN** abundance of spreaders, mills, and gutta-percha calenders. Address Box No. 788, care of INDIA RUBBER WORLD.

**RUBBER AND GR-S MIXING, COMPOUNDING, AND CALENDERING.** All work done under careful supervision. Contract work invited. Phone New Haven 8-6151. ELM CITY RUBBER CO., Box 1864, New Haven, Conn.

**41 AUTOMATIC AUTOCLAVES INCLUDING COMPOUNDING AND FOAMING EQUIPMENT AVAILABLE TO PRODUCE FOAM PRODUCTS, PILLOWS, ON CONTRACT BASIS. IMMEDIATE PROPOSAL CONSIDERED FOR LONG RANGE PRODUCTION. WE MAKE OWN MOLDS. CONTACT:**

### WILMINGTON FOAM RUBBER COMPANY

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## WANTED

**Financially responsible organization will purchase complete sponge and mechanical rubber goods plant with presses, calenders, mills and extruders. Will consider all offers. Please give complete details first letter.**

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# BROCKTON TOOL COMPANY

Central Street

QUALITY MOULDS FOR ALL PURPOSES

South Easton, Mass.

THE FIRST STEP—A QUALITY MOULD

(Classified Advertisements Continued on Page 245)

military consumption is estimated at a maximum of 20,000,000 pounds a year, or about 2% of the industry's textile filament yarn and staple production capacity.

No changes occurred in rayon tire yarn and fabric prices during the period from March 16 to April 15, and current prices follow:

#### Rayon Prices

Tire Yarns		
1100/480	.....	\$0.62/\$0.63
1100/490	.....	.62
1150/490	.....	.62
1650/720	.....	.61/ .62
1650/980	.....	.61
1900/980	.....	.61
2200/960	.....	.61
2200/980	.....	.60
4400/2934	.....	.63
Tire Fabrics		
1100/490/2	.....	.72
1650/980/2	.....	.695/.73
2200/980/2	.....	.685

## COTTON AND FABRICS

#### NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Jan.	Mar.	Mar.	Mar.	Apr.	Apr.
	27	17	24	31	7	14
May	43.77	45.39	45.39	45.39	45.39	45.39
July	43.31	45.37	45.39	44.94	44.40	44.71
Oct.	41.36	41.78	41.31	40.65	39.45	39.72
Dec.	40.96	40.98	40.72	40.09	38.71	39.05
Mar.	40.86	40.78	40.62	39.90	38.59	38.94
May	40.67	40.60	40.46	39.66	38.39	38.70
July	40.40	40.20	40.16	39.26	38.03	38.37

**T**RADING on the New York Cotton Exchange was moderate and largely professional in nature during the period from March 16 to April 15. During the latter part of March most traders showed a tendency to mark time pending a clearer picture of the acreage outlook for the new crop, developments in the cotton goods market, and changes in the international situation. Easier prices prevailed at the start of April as the result of the slow demand for textiles, the strike involving a number of southern mills, and the growing indications that the governments' acreage goal for the new crop would be achieved. Toward the middle of April some recovery in new crop positions took place because of an oversold condition.

The spot price for 15/16-inch middling cotton held at the ceiling level of 46.06¢ throughout the period. The tight position of old crop May was reflected in the unchanged 45.39¢ ceiling price, while July futures and new crop futures fluctuated in accordance with the trends described above.

#### Fabrics

While demand is excellent for all gray goods construction, numbered and army ducks are in extremely short supply, with quantities insufficient to meet military orders. Most duck mills have discontinued specialty constructions and are making a relatively small number of standard constructions to facilitate production. Many if not most ducks mills have already allotted 80% of their production to rated orders, as required by NPA Order M-53, and are turning down further requests.

Second-quarter production is said to be almost completely sold out in most constructions, and many sales into the third quarter were reported for such fabrics as sateens, broken twills, hose and belting

ducks, and chafer fabrics. Demand for osnaburgs was said to be unusually strong into the third quarter, particularly for the 40-inch 2.11 yard construction. Interest in sheetings and print cloths continued at high levels, but most sales were in second-hand fabrics owing to the shortage of supplies for nearby delivery. Some print cloth constructions were said to be selling heavily into the fourth quarter at ceiling prices, but most mills were reluctant to place orders beyond the third quarter.

#### Cotton Fabrics

Drills			
39-inch 1.85-yd.	..... yd.	\$0.49	/ \$0.50 1/2
2.25-yd.	..... yd.	.42	/ .42 3/4
Ducks			
38-inch 1.78-yd. S. F.	..... yd.	.487 1/2	/ .50 1/2
2.00-yd. D. F.	..... yd.	.445	/ .46
51.5-inch, 1.35-yd. S. F.	..... yd.	.645	/ .66 1/2
Hose and belting	.....	.82	
Osnaburgs			
40-inch 2.11 yd.	..... yd.	.385	
3.65-yd.	..... yd.	.235	
Raincoat Fabrics			
Bombazine, 64x60 5.35-yd yd.	nom.		
Print cloth, 38 1/2-inch, 64x60.	.23	/	.2375
Sheeting, 48-inch, 4.17-yd.	.267 1/2	/	.27 3/4
52-inch 3.85-yd.	.29 1/2	/	.29 3/4
Chafer Fabrics			
14-oz./sq. yd. Pl.	..... lb.	.84	/ .865
11.65-oz. sq. yd. S.	.....	.78	/ .80
10.80-oz./sq. yd. S.	.....	.8175	/ .84
8.9-oz./sq. yd. S.	.....	.83	/ .855
Other Fabrics			
Headlining, 58-inch 1.35-yd.	..... yd.	.62	
2-ply.	..... yd.	.725	/ .74
64-inch, 1.25-yd. 2-ply.	.....	.71	/ .725
Sateens, 53-inch 1.32-yd.	.....	.75	/ .79 1/2
Tire Cords			
K. P. std., 12-3-3.	..... lb.	nom.	
12-4-2.	.....	.95	

## Financial

(Continued from page 220)

**Endicott-Johnson Corp.,** Johnson City, N. Y., and subsidiaries. Year ended November 30, 1950: net profit, \$1,319,683, equal to \$1.36 a common share, compared with \$2,297,825, or \$2.48 a share, in the preceding fiscal year; net sales, \$133,330,507, against \$131,677,018.

**Eagle-Picher Co.,** Cincinnati O. Quarter ended February 28, 1951: net income, \$914,851, equal to \$1.01 a common share, against \$131,370, or 15¢ a share, in the corresponding period last year; net sales, \$21,597,511, against \$12,433,000.

**Dunlop Tire & Rubber Goods Co., Ltd.,** Toronto, Ont., Canada. For 1950: net profit, \$304,202, against net loss of \$176,000 in 1949; provision for depreciation, \$382,000, against \$301,000; current assets, \$8,255,263, current liabilities, \$5,230,367, against \$4,667,435 and \$1,540,053, respectively, on December 31, 1949.

**Circle Wire & Cable Corp.,** Maspeth, L. I., N. Y. for 1950: net income \$2,120,680, equal to \$2.83 a common share, against \$411,913, or 55¢ a share, in 1949; net sales, \$15,848,212, against, \$8,535,205. March quarter: net income, \$564,780, equal to 75¢ a common share; net sales, \$4,663,200.

**Dow Chemical Co.,** Midland, Mich., and subsidiaries. Nine months to February 28, 1951: net income, \$29,108,262, equal to \$4.31 a common share, compared with \$22,681,425 or \$4.00 a share, a year earlier; sales, \$240,746,589, against \$154,721,323.

**Diamond Alkali Co.,** Cleveland, O. First quarter, 1951: net income, \$1,789,601, equal to \$1.65 a share, against \$890,060, or 82¢ a share, in the first quarter last year; sales, \$18,977,055, against \$12,734,924.

**Denman Tire & Rubber Co.,** New York, N. Y. For 1950: net income \$128,039, equal to 59¢ a common share, compared with \$7,724, or 27¢ a preferred share, the year before.

**Detroit Gasket & Mfg. Co.,** Detroit, Mich. For 1950: net income, \$1,846,664, equal to \$3.52 a common share, against \$530,649, or \$1.01 a share, in 1949.

**Crown Cork & Seal Co., Inc.,** Baltimore, Md., and wholly owned domestic subsidiaries. Year ended December 31, 1950: net income, \$2,486,214, equal to \$1.60 each on 1,207,790 common shares, compared with \$2,019,867, or \$1.22 a share, in the preceding year; net sales, \$89,416,762, against \$82,390,722; federal income taxes, \$1,925,221, against \$1,161,593.

**Cooper Tire & Rubber Co.,** Findlay, O. For 1950: net profit, \$575,612, equal to \$3.67 a common share, against net loss of \$347,061 in 1949; net sales, \$13,274,779, against \$5,943,688.

**Collyer Insulated Wire Co.,** Pawtucket, R. I. For 1950: net income, \$350,708, equal to \$2.34 a share, against a loss of \$24,285 in 1949.

**Carborundum Co.,** Niagara Falls, N. Y. For 1950: net profit, \$7,530,859, equal to \$14.79 a share, against \$1,475,038, or \$2.90 a share in 1949; net sales, \$56,683,148 against 38,714,831.

(Dividends on page 248)

## Compounding Ingredients—Price Changes and Additions

#### Accelerator-Activators, Organic

Emery 600 ..... lb. \$0.195/ \$0.2225

#### Carbon Blacks

(CC)	Spheron C.	..... lb.	.14	/	.185
	N.	..... lb.	.25	/	.30
(EPC)	Spheron #9.	..... lb.	.074	/	.1225
	Texas E.	..... lb.	.07	/	.1075
(HPC)	Spheron #4.	..... lb.	.074	/	.1225
(MPC)	Spheron #6.	..... lb.	.074	/	.1225
	Texas M.	..... lb.	.07	/	.1075
(HAF)	Philblack O.	..... lb.	.075	/	.119
	Vulcan #3.	..... lb.	.079	/	.122
(MAF)	Philblack A.	..... lb.	.0575	/	.10
(HMF)	Sterling L.	..... lb.	.055	/	.095
(FEP)	Sterling SO.	..... lb.	.06	/	.10
(SRF)	Gastex.	..... lb.	.04	/	.08
	Pelletex.	..... lb.	.04	/	.08
	Sterling, NS, R. S.	..... lb.	.04	/	.08

**Reinforcers, Other Than Carbon Black**  
Calcene T. .... ton 75.00 / 95.00

## CLASSIFIED ADVERTISEMENTS

Continued

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WANTED TO BUY: SMALL/OR MEDIUM SIZED PLANT PRODUCING molded goods and/or wrapped goods, preferably with experienced personnel. Give full details. Address Box No. 793, care of INDIA RUBBER WORLD.

FOR SALE: RUBBER-PLASTIC PLANT COMPLETE WITH mills, extruders, grinders, etc. With or without real estate and operating business, Address Box No. 795, care of INDIA RUBBER WORLD.

**MIXING AND MASTICATION CAPACITY AVAILABLE** to customers' specifications on No. 3A Banbury Type Machine. We are manufacturers of Molded, Lathe Cut, and Extruded Soft Rubber Goods and have surplus mixing capacity.

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We do milling and compounding of all types — blacks or colors — Master Batches —  
All mixing done under careful supervision and laboratory control.

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LIQUIDATING RUBBER MOLDING PLANT IN NEW YORK CITY 30 HYDRAULIC PRESSES 24 x 24" to 42 x 42", rams 12 to 20", 2- to 4-opening; Royle Tubers 24" to 6" dia. screw; Vulcanizers, Compressors, Pumps, Accumulators, etc. SEND FOR COMPLETE LIST. Also line of three Farrel 18 x 50" Mills, complete with 200 HP. motor and drive; 22 x 60" Farrel-Birmingham Latest Model Mill, chrome-plated rolls with 125 HP. motor and drive; High-Pressure Vulcanizer 6 x 18" long, quick-opening door. Send your inquiries. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York 38, N. Y.

FOR SALE: BANBURY MIXERS, MILLS, CALENDERS, LABORATORY Mill and Banbury Unit, Extruders, Tubers, Hydraulic Presses. Send for detailed bulletin. EAGLE INDUSTRIES, Inc., 110 Washington Street, New York 6, N. Y. Dlgby 4-8364-5-6.

FOR SALE: 24 x 48 FARREL CALENDER EXTRA-HEAVY DUTY 3-roll—new 1948—used very little. With Farrel Herringbone Reduction Gear unit, automatic oiler, Herringbone connecting and bull gear. Even and friction speeds, bed plate. No motor or controls. Push-button adjustments. Address Box No. 785, care of INDIA RUBBER WORLD.

FOR SALE AT A SAVINGS—ONE BRAND NEW, STILL IN original crate, #16 Sharples Stationary Super-Centrifuge Clarifier, complete with two-speed motor and control for operation on 220 volt, 3 ph., 60 cycle current, with special construction for contact with pigmented latex, including a supply of spare parts and tools. THE MOHICAN RUBBER CO., Ashland, Ohio.

FOR SALE: 3—ROBINSON UNIQUE FRIGIDISC GRINDERS WITH 50 hp. 220/440-volt integral motors made by Mercer Robinson Co., New York City—2 new—1 only slightly used. 1—Robinson gyro sifter—slightly used. 2—Thropp 8-opening presses, 36 x 36 steam heated platens—18" rams for 2,000 lb. W. P. 1—Thropp 4-opening press, 36 x 36 steam heated platens, new 18" chrome plated ram for 2,000 lb. W. P. 1—#3A Coulter special volumetric blanking machine for heel and sole biscuits—new. 1—Biggs Boiler Works open steam vertical vulcanizer 36" diam. x 48" deep with hinged counterbalanced cover—new. 1—Pancorbo chopperless motor, used. 1—Pancorbo span grinder, used. 2 Lawson 38" square paper or stock cutters, used. 1—Chandler Price 39" square paper or stock cutter, used—with motor. Address Box 786, care of INDIA RUBBER WORLD.

FOR SALE: BANBURY BODIES AND PARTS, BODIES FOR #11 spray, #9 spray, and #9 jacketed-type mixers, complete with door. Spare parts for most sizes, including rotors, rotor collars, end frames, side jackets, door tops, gland rings, hoppers, connecting gears, and many others. Over sixteen years' Banbury rebuilding experience at your service. For details and prices write INTERSTATE WELDING SERVICE, Offices, Metropolitan Building, Akron 8, Ohio.

## LIQUIDATION

Entire rubber molding division of nationally famous manufacturer located in New York City

### Hydraulic Presses

- 4—Stewart Bolling 32"x32"-20" dia. ram, 4 open., heated steel platens.
- 4—Stewart Bolling 24"x24"-18" dia. ram, 3-4 open., heated steel platens.
- 12—24"x24"-14" dia. ram, single and multiple open.
- 1—24"x24"-10" dia. ram
- 1—30"x30"-16" dia. ram
- 4—36"x36"-12" dia. ram, single and multiple open.
- 3—Farrel 42"x42"-12" dia. ram, single and mult. open.

All presses have hydraulic valves and gauges.

### Hydraulic Pumps

- 2—Worth. vert. Triplex 1½"x6" str. V-Belt to 25 HP. A-C motors
- 2—Trenchmarine rotary—15 HP. A-C motors

### Tubers

- 1—Royle #1 Perfected water cooled screw, chain drive, 5 HP. A-C motor
- 1—Royle #2 Perfected with Timken Roller thrust bearing dual HP. motor
- 5½-11 HP., 385 to 1170 R.P.M.
- 7½-15 HP., 435 to 870 R.P.M.

### Vulcanizers

- 1—Struthers-Wells 4"x16" horiz. with quick opening door. Taylor recording instruments, track, 3 trucks, plates.
- 1—Vert. 4"x6" quick opening door

### Cutter

- 1—Ferriot conveyor cutter 24" wide belt, 12' long, motor driven

### Accumulator

- Tank type, 4" dia. ram, 5' stroke filled with approx. 10 tons scrap iron, 2500 P.S.I.

### Air Compressors

- 1—Fuller 2-stage rotary—100 P.S.I. at 870 R.P.M. direct motor drive, 60 HP. 3 phase 60 cycle 220 volt motor and starter with air receiver, after cooler, and air filter.
- 2—Kellogg 2 cyl. V-Belt to 10 HP. A-C motors with air receivers

### Toggle Presses

- 1—Ferriot 20"x48" heated platens V-Belt drive and 2 HP. gear head A-C motor
- 1—Ferriot 20"x33"

### Miscellaneous

Heated steel platens, all sizes. 34 steel work tables. Hydraulic piping and valves. Washers, tumblers, etc.

Many of the above machines were recently installed and are still erected as when operated.

Prices are low as premises must be vacated.

This liquidation is under the exclusive direction of

## EAGLE INDUSTRIES, INC.

110 Washington Street, New York 6, N. Y.

Phone: Dlgby 4-8364

Cable: Eaglendus

# U. S. Imports, Exports, and Reexports of Crude and Manufactured Rubber

January, 1951			January, 1951			January, 1951		
Quantity		Value	Quantity		Value	Quantity		Value
<b>Imports for Consumption of Crude and Manufactured Rubber</b>			<b>Exports of Domestic Merchandise</b>					
<b>UNMANUFACTURED, Lbs.</b>			<b>UNMANUFACTURED, Lbs.</b>					
Crude rubber.....	190,094,437	\$90,707,863	Chicle and chewing gum bases.....	346,049	\$137,766	Inner tubes: auto.....	no.	31,864
Latex.....	16,805,305	10,283,208	Balata.....	5,465	6,897	Truck and bus.....	no.	23,831
Crude chicle.....	1,090,912	597,109	Synthetic rubbers.....			Aircraft.....	no.	673
Guayule.....	197,000	84,977	GR-S types.....	195,214	33,979	Other.....	no.	13,822
Balata.....	540,973	290,534	Neoprene.....	857,344	324,680	Solid tires: truck and industrial.....	no.	1,534
Jelutong or Pontianak.....	411,879	227,244	Nitrile types.....	224,172	109,058	Tire repair materials.....	lbs.	183,508
Gutta percha.....	242,402	118,988	"Thiokol".....	1,300	658	Other.....	lbs.	345,251
Synthetic rubber.....	3,380,824	774,967	Polyisobutylene.....	11,402	3,184	Rubber and friction tape.....	lbs.	53,199
Reclaimed rubber.....	268,800	27,538	Other, except butyl.....	3,501	8,614	Belting.....	lbs.	86,746
Scrap rubber.....	7,188,636	264,422	Reclaimed rubber.....	2,993,199	270,276	Auto and home.....	lbs.	111,270
TOTALS.....	220,221,168	\$103,286,850	Scrap rubber.....	2,044,625	144,031	Transmission: V-belts.....	lbs.	113,958
			TOTALS.....	6,682,271	\$1,039,143	Flat belts.....	lbs.	51,242
						Other.....	lbs.	11,046
<b>MANUFACTURED</b>			<b>MANUFACTURED</b>			Conveyer and levitator.....	lbs.	63,976
Tires and casings.....			Rubber cement.....	72,529	\$138,937	Other.....	lbs.	516
Auto, etc.....	no.	6,665	Rubberized fabric.....			Hose and tubing.....	lbs.	444,781
Bicycle.....	no.	8,930	Auto cloth.....	8,336	7,602	Packing.....	lbs.	172,525
Other.....	no.	903	Piece goods and hospital sheeting.....	87,894	69,140	Mats, flooring, tiling.....	lbs.	437,974
Inner tubes: auto, etc., no.	17,727	43,422	Rubber footwear.....			Thread: bare.....	lbs.	25,140
Rubber footwear.....			Boots.....	5,731	23,378	Textile covered.....	lbs.	24,113
Boots.....	1,505	3,788	Shoes.....	4,154	9,955	Gutta percha manu- facturers.....	lbs.	6,685
Shoes and over- shoes.....	14,184	20,866	Rubber-soled canvas shoes.....	12,520	31,999	Compounded latex and rubber for further manu- facture.....	lbs.	682,103
Rubber-soled canvas shoes.....	179	267	Soles.....	20,010	67,756	Other natural and synthe- tic rubber manufactures.....		562,609
Athletic balls: golf.....	45,480	12,381	Heels.....	44,412	55,007	TOTALS.....		\$7,895,032
Tennis.....	36,960	11,050	Soling and toplit sheets.....	270,513	56,503	GRAND TOTALS.....		
Other.....	69,408	8,158	Gloves and mit- tens.....	12,811	52,373	ALL RUBBER EXPORTS.....		\$8,934,175
Rubber toys, except balloons.....		36,117	Drug sundries: water bottles and foun- tain syringes.....	17,233	12,932	<b>Reexports of Foreign Merchandise</b>		
Hard rubber goods.....			Other.....		229,482	<b>UNMANUFACTURED, Lbs.</b>		
Combs.....	no.	106,560	And rubberized clothing.....		134,164	Crude rubber.....	1,834,048	\$1,150,246
Other.....		54,050	Toy and novelty bal- loons.....	29,606	19,880	Balata.....	9,754	3,800
Rubberized printing blankets.....	756	1,969	Erasers, except pencil lbs.	25,225	19,880	Scrap rubber.....	218,454	8,192
Rubber and cotton packing.....	1,467	3,421	Hard rubber goods.....			TOTALS.....	2,062,256	\$1,162,238
Packing and gaskets.....		1,196	Battery boxes.....	27,839	52,037	<b>MANUFACTURED</b>		
Insulators, molded.....		8,763	Other electrical goods.....	128,361	46,618	Rubber footwear.....		
Belting.....	11,668	8,286	Combs, finished.....	3,768	5,416	Shoes.....	228	\$445
Hose and tubing.....		4,166	Other.....		7,053	Soling and toplit sheets.....	1,970	1,261
Drug sundries.....		21,499	Tires and casings.....			Gloves and mit- tens.....	2,700	8,100
Nipples and paci- fiers.....	2,412	4,899	Truck and bus.....	46,829	2,250,222	Drug sundries.....		150
Instruments.....	2,648	6,109	Auto.....	52,174	823,117	Toys and balls, except balloons.....		5,752
Other rubber products.....		167	Aircraft.....		87,633	Inner tubes, except auto, truck and bus.....	18	101
Gutta percha manu- factures.....	5,431	5,562	Farm tractor.....	4,385	169,374	Tire repair materials, ex- cept camelback.....	150	144
Rubber heels and soles.....	52,614	5,933	Other off-the-road.....	13,428	20,065	Rubber packing.....	266	160
Bands.....	8,931	10,549	Bicycle.....		2,471	Other natural and synthe- tic rubber manufactures.....		2,835
Synthetic rubber products.....		42	Motorcycle.....	3,278	48,697	TOTALS.....		\$18,948
Other soft rubber goods.....		126,412				GRAND TOTALS.....		\$1,181,186
TOTALS.....		\$549,071				SOURCE: Bureau of Census, United States De- partment of Commerce, Washington, D. C.		
GRAND TOTALS, IMPORTS.....		\$103,835,921						

## Estimated Automotive Pneumatic Casing and Tube Shipments, Production, Inventory, February, January, 1951 and 1950

	February, 1951	% of Change from Preceding Month	January, 1951	First Two Months, 1951	First Two Months, 1950
<b>Passenger Casings</b>					
Shipments.....					
Original equipment.....	2,601,331		2,592,541	5,193,872	5,638,424
Replacement.....	2,319,747		3,061,918	5,381,665	4,523,452
Export.....	48,348		52,554	100,902	86,065
TOTAL.....	4,969,426	-12.93	5,707,013	10,676,439	10,247,931
Production.....	4,697,767	-13.54	5,433,309	10,131,076	11,316,565
Inventory end of month.....	2,506,974	- 8.79	2,748,482	2,506,974	9,784,715
<b>Truck and Bus Casings</b>					
Shipments.....					
Original equipment.....	400,301		442,705	843,006	701,923
Replacement.....	738,435		749,986	1,488,421	1,049,596
Export.....	65,931		61,786	127,717	129,822
TOTAL.....	1,204,667	- 3.97	1,254,477	2,459,144	1,881,341
Production.....	1,189,378	-10.62	1,330,639	2,520,017	2,201,414
Inventory end of month.....	800,064	- 0.41	803,384	800,064	2,011,912
<b>Total Automotive Casings</b>					
Shipments.....					
Original equipment.....	3,001,632		3,035,246	6,036,878	6,340,347
Replacement.....	3,058,182		3,811,904	6,870,086	5,573,048
Export.....	114,279		114,340	228,619	215,877
TOTAL.....	6,174,093	-11.31	6,961,490	13,135,583	12,129,272
Production.....	5,887,145	-12.96	6,763,948	12,651,093	13,517,979
Inventory end of month.....	3,307,038	- 6.89	3,551,866	3,307,038	11,796,627
<b>Passenger and Truck and Bus Tubes</b>					
Shipments.....					
Original equipment.....	3,000,163		3,038,670	6,038,833	6,334,568
Replacement.....	2,842,214		3,487,053	6,329,267	4,471,032
Export.....	67,577		69,356	136,933	116,329
TOTAL.....	5,909,954	-10.39	6,595,079	12,505,033	10,921,929
Production.....	5,144,242	-13.55	5,950,266	11,094,508	11,432,438
Inventory end of month.....	5,154,104	-11.93	5,852,488	5,154,104	11,058,688

NOTE: Cumulative data on this report include adjustments made in prior months.  
SOURCE: The Rubber Manufacturers Association, Inc., New York, N. Y.

## Trade Lists Available

The Commercial Intelligence Branch, United States Department of Commerce, Washington, D. C., recently compiled the following trade lists, of which mimeographed copies may be obtained by American firms from this Branch and from Department of Commerce field offices at \$1 a list for each country.

Aircraft & Aeronautical Supply & Equipment Importers & Dealers—Mexico; Switzerland; Uruguay; Colombia.

Automotive Equipment Importers & Dealers—Cuba; Ecuador; Syria; United Kingdom.  
Boot & Shoe Importers & Dealers—Ceylon; Colombia; Guatemala; Honduras; Mexico; Netherlands West Indies; Switzerland; Venezuela; Lebanon.

Boot & Shoe Manufacturers—Australia; Colombia; India; Israel; Netherlands; Panama; Sweden; Union of South Africa; Egypt; Greece; Mexico.

Electrical Plastic Pressure-Sensitive Coated Tape Manufacturers—Germany.

Electrical Supply & Equipment Importers & Dealers—Algeria; Argentina; Austria; Bermuda; Costa Rica; Cuba; Denmark; Greece; Thailand.

Office Supply & Equipment Importers & Dealers—Bermuda; El Salvador; Morocco.

Plastic Material Manufacturers, Molders, Laminators & Fabricators of Plastic Products—Argentina; Canada; Finland; Uruguay.

Rubber Goods Manufacturers—British Malaya; Chile; Colombia; Sweden; Union of South Africa.

## CLASSIFIED ADVERTISEMENTS

Continued

### MACHINERY AND SUPPLIES FOR SALE (Continued)

FOR SALE: 1 PRACTICALLY NEW BALDWIN 8 (EIGHT) opening press, two 14" diameter rams, lift tables, pumping equipment and instrument board, push button control. Two 24" x 24" hydraulic presses, 18" ram. One 30" x 30" press, 18" ram, all steel. Four 12" x 12" presses, 7 1/2" ram. Three cement churns, two rubber spreaders, one saturator, one 8" x 18" four-roll calendar, one 14" x 42" calendar, one experimental mill, three 12" x 32" Day 3-roll color mills, two 40-gallon pony mixers, one W & P jacketed mixer, two Day double-arm jacketed mixers, three embossing calendars, two 36", two 40", and one 60" mills. Address Box No. 787, care of INDIA RUBBER WORLD.

FOR SALE: READ 250-GAL. DOUBLE-ARM JACKETED SIGMA blade mixers. Stokes rotary 16-punch pellet presses. FERRY EQUIPMENT CORP., 1524 W. Thompson St., Phila., Pa.

FOR SALE: FARREL 18" x 45", 16" x 48", and 15" x 36", 2-ROLL Rubber Mills, also new Lab. 6" x 12" Mixing Mills and Calenders, & other sizes up to 84". Rubber Calenders. Extruders 2" to 3". Ball & Jewell Rotary Cutters. Sargent 3-apron conveyer, 6-fan Rubber Drier. Baker-Perkins Mixers 200 & 9 gals. heavy-duty double-arm jacketed; also single-arm mixers. Impregnating Units Lab. size & up. Large stock Hydraulic Presses from 12" x 12" to 42" x 48" platens, from 50 to 1500 tons. Hydraulic Pumps and Accumulators. Grinders, Cutters, Crushers, Churns, etc. SEND FOR SPECIAL BULLETIN. WE BUY YOUR SURPLUS MACHINERY. STEIN EQUIPMENT COMPANY, 90 WEST STREET, NEW YORK 6, N. Y.

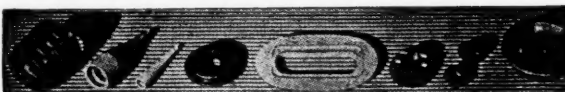
HYDR. CONVEYOR BELT PRESS 33" by 2' 8". NEW. MODERN construction, delivery prompt. ADOLF ROGGMANN, Rubber Machinery, Hamburg 20, Germany.

FOR SALE: ONE 16 x 40" MILL WITH 50 HP. MOTOR & EN-closed drive; one 16 x 42" mill, with 50 hp. motor and silent chain drive; one 7-opening hydraulic press with 24 x 54" platens, complete with new pumping unit. Address Box No. 789, care of INDIA RUBBER WORLD.

FOR SALE: TWO-3-ROLL 14" x 42" BIRMINGHAM GUTTA percha calendars complete with motors and drives. Three A. T. and M. Co. 51" rubber spreaders with pipe coils and tail rolls. Address Box No. 791, care of INDIA RUBBER WORLD.

### AIR BAG BUFFING MACHINERY STOCK SHELLS      HOSE POLES MANDRELS

NATIONAL SHERARDIZING & MACHINE CO.  
868 WINDSOR ST.      HARTFORD, CONN.  
Akron      Representatives      New York  
San Francisco



INDUSTRIAL RUBBER GOODS  
BLOWN — SOLID — SPONGE  
FROM NATURAL, RECLAIMED, AND SYNTHETIC RUBBER  
THE BARR RUBBER PRODUCTS CO.      SANDUSKY OHIO



**RUBBER  
HARDNESS**  
THE LANGUAGE  
OF THE RUBBER  
INDUSTRY  
SINCE 1915

### DUROMETER

VARIOUS MODELS  
FOR TESTING THE  
ENTIRE RANGE

TECHNICAL DATA  
ON REQUEST

THE SHORE  
INSTRUMENT  
& MFG. CO., INC.  
90-35 VAN WYCK  
EXPRESSWAY  
JAMAICA 2, N. Y.

Economical

# NEW

Efficient

**Mills - Spreaders - Churns  
Mixers - Hydraulic Presses  
Calenders**

... GUARANTEED ...

Rebuilt Machinery for Rubber and Plastics

## LAWRENCE N. BARRY

41 Locust Street

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**USED MACHINERY** FOR THE **RUBBER**  
AND ALLIED INDUSTRIES  
MILLS, CALENDERS, HYDRAULIC PRESSES,  
TUBERS, VULCANIZERS, MIXERS, ETC.  
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**HOWE MACHINERY CO., INC.**  
30 GREGORY AVENUE      PASSAIC, N. J.  
Designers and Builders of  
"V" BELT MANUFACTURING EQUIPMENT  
Cord Lettering, Expanding Mandrels, Automatic Cutting,  
Sliving, Flipping and Roll Drive Wrapping Machines.  
ENGINEERING FACILITIES FOR SPECIAL EQUIPMENT  
Call or write.

## NEW and REBUILT MACHINERY

Since 1891

### L. ALBERT & SON

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Los Angeles, Calif.

## GUARANTEED REBUILT MACHINERY

IMMEDIATE DELIVERIES FROM STOCK

MILLS, CALENDERS, TUBERS  
VULCANIZERS, ACCUMULATORS



HYD. PRESSES, PUMPS, MIXERS  
CUTTING MACHINES, PULVERIZERS

### UNITED RUBBER MACHINERY EXCHANGE

NEW ADDRESS: 183-189 ORATON ST.

CABLE "URME"

NEWARK 4, N. J.

## Dividends Declared

COMPANY	STOCK	RATE	PAYABLE
American Hard Rubber Co.	Com.	\$0.50	Mar. 31
Anaconda Wire & Cable Co.	Com.	0.75 incr.	Apr. 24
Baldwin Rubber Co.	Com.	0.15 q.	Apr. 27
Belden Mfg. Co.	Com.	0.20 extra	Apr. 27
Brown Rubber Co., Inc.	Com.	0.40 q.	Mar. 5
Brunswick-Balke-Collender Co.	Com.	0.25	Mar. 1
Canadian Tire Corp., Ltd.	Pfd.	1.25 q.	Apr. 2
Canadian Wire & Cable Co.	Com.	0.30 q.	Mar. 1
	A	1.00 q.	Mar. 15
	B	0.75 q.	Mar. 15
Carborundum Co.	Com.	0.75 q. incr.	Mar. 9
Converse Rubber Co.	Com.	1.00 accum.	Apr. 10
Dayton Rubber Co.	Com.	0.30	Apr. 25
	\$2.00 Cl. A	0.50 q.	Apr. 2
Denman Tire & Rubber Co.	Com.	0.10	Apr. 2
	Pfd.	0.12 1/2 q.	Apr. 25
Detroit Gasket & Mfg. Co.	Com.	0.25 q.	Apr. 20
DeVilbiss Co.	Com.	0.50	Mar. 20
Dewey & Almy Chemical Co.	Com.	0.40	Apr. 2
Endicott Johnson Corp.	Pfd.	1.00 q.	Apr. 2
Faultless Rubber Co.	Com.	0.50 q.	Apr. 2
Flintkote Co.	\$1 Pfd.	1.00 q.	Mar. 15
Garlock Packing Co.	Com.	0.25 q.	Mar. 30
General Cable Corp.	Com.	0.15 resumed	Apr. 2
	1st Pfd.	1.00 q.	Apr. 2
	2nd Pfd.	0.50 q.	Apr. 2
General Electric Co.	Com.	0.75 incr.	Apr. 25
General Motors Corp.	Com.	1.00	Feb. 15
	\$5 Pfd.	1.25 q.	May 1
	\$3.75 Pfd.	0.93 3/4 q.	May 1
General Tire & Rubber Co.	Com.	0.50 q. incr.	Feb. 28
	4 1/4% Pfd.	1.06 1/4 q.	Mar. 30
	3 3/4% Pfd.	0.93 3/4 q.	Mar. 30
	3 1/4% Pfd.	0.81 1/4 q.	Mar. 30
Goodall Rubber Co.	Com.	0.15 q.	May 15
	Pfd.	2.50 s.	May 15
Goodrich, B. F., Co.	Com.	0.50 new	Mar. 31
	\$5 Pfd.	1.15 q.	Mar. 31
	Pfd.	1.25 q.	Mar. 31
Goodyear Tire & Rubber Co.	Com.	1.00 q.	June 15
	Pfd.	1.25 q.	June 15
Goodyear Tire & Rubber Co. of Canada, Ltd.	4% Pfd.	0.50 q.	Apr. 30
Hewitt-Robins, Inc.	Com.	0.40 q.	Mar. 15
Jenkins Bros.	F. S.	1.00	Mar. 29
	Com.	0.25	Mar. 29
Johns-Manville Corp.	Com.	0.75	Mar. 14
J. B. Kleinert Rubber Co.	Com.	0.25 q.	Mar. 14
Lee Rubber & Tire Corp.	Com.	0.75 q.	May 1
	0.50 extra	May 1	Apr. 16
Midwest Rubber Reclaiming Co.	Com.	0.25 q.	Apr. 1
	Pfd.	0.50 1/4 q.	Apr. 1
Minnesota Mining & Mfg. Co.	Com.	0.25	Mar. 12
	\$4 Pfd.	1.00 q.	Mar. 12
Raybestos-Manhattan, Inc.	Com.	0.50	Mar. 12
Rome Cable Corp.	Com.	0.25 q. incr.	Mar. 28
	4% Pfd.	0.30	Apr. 2
Russell Mfg. Co.	Com.	0.37 1/2	Mar. 15
Seiberling Rubber Co.	4 1/2% Pfd.	1.13 q.	Apr. 1
	5% Pfd.	1.25 q.	Apr. 1
	Com.	0.25 resumed	Mar. 10
Seiberling Rubber Co. of Canada, Ltd.	Com.	0.25	Mar. 5
A. G. Spalding & Bros., Inc.	Com.	0.25 q.	Mar. 15
Thermoid Co.	Com.	0.15 q.	Mar. 31
Tyer Rubber Co.	\$4.25 Pfd.	1.06 1/4 q.	Feb. 15
U. S. Rubber Reclaiming Co., Inc.	Pfd.	0.35 accum.	Apr. 2
United States Rubber Co.	Com.	1.00	Mar. 9
	Pfd.	2.00 q.	June 1
Viceroy Mfg. Co., Ltd.	Com.	0.25 q. incr.	Mar. 15
Whitehead Bros. Rubber Co.	Com.	0.15 q.	May 15

## GR-S Polymers

(Continued from page 200)

X-NUMBER	POLYMER DESCRIPTION
DESIGNATION	
X-626 GR-S	Same as X-625 GR-S, except stabilized with 1.25% PBNA.
X-627 GR-S	GR-S-65 with butadiene/styrene charge ratio adjusted to give 13±1% bound styrene on the finished polymer.
X-628 GR-S	Same as X-626 GR-S, except Mooney viscosity is 63-71 (ML-4). Latex masterbatched with 25 parts rubber processing oil per 100 parts of polymer.
X-629 GR-S	Same as X-628 GR-S, plus 50 parts Philblack O per 100 parts polymer in the latex masterbatch.
X-630 GR-S	Same as GR-S, except butadiene-styrene charge ratio adjusted to give 20+1% bound styrene.
X-631 GR-S	Same as GR-S-50, except butadiene-styrene charge ratio adjusted to give 20+1% bound styrene.
X-632 GR-S	Similar to X-590 GR-S, except butadiene-styrene charge ratio is 95/5. Reaction temperature, 40-43° F. Mooney viscosity of polymer (ML-4 at 212° F.), 40+7. Stabilizer, 1.25 BLE.
X-633 GR-S Latex	Butadiene-styrene charge ratio, 50/50. A latex emulsified with potassium oleate in the peroxamine formula, polymerized at 50° F. to a higher conversion. Mooney viscosity of the contained polymer (ML-4 at 212° F.), approximately 70-100. Maximum solids content, 49.0%.

### Notes

(1) Dresinate 731 and Dresinate 214 are now interchangeable on an equimolar basis in all experimental 41° F. polymers.

(2) Para-menthane hydroperoxide, diisopropyl benzene hydroperoxide, cumene hydroperoxide, or Dioxi 7 may be used alone or in mixtures in polymerizing the following experimental polymers: X-568, -577, -578, -580, -581, -582, -583, -585, -587, -588, -590, -591, -593, -594, -595, -596, -597, -598, -599, -600, -601, -602, -604, -607, -608, -609, -610, -611, -612, -613, -616, -617, -618, -619, -620, -623, -624, -625, -626, -628, -629, -632, and -633.

"CUT RITE BLOC," A NEW, LONG-LASTING cutting block for use in cutting leather, rubber, cloth, canvas, cork, copper, soft plastics, aluminum, fiber, and paper products, is being manufactured by Rubber Engineering & Chemical Co., Lake Zurich, Ill., using Hycar nitrile rubber as a component. Custom made in various sizes, the tough, durable surface of the new cutting block is said to stand up under constant hard usage and provide extra cutting efficiency and lower maintenance costs.

## United States Rubber Statistics—December and Yearly Totals, 1950

(All Figures in Long Tons, Dry Weight)

	December, 1950						Yearly Totals, 1950						
	New Supply			Distribution			New Supply			Distribution			Year End- Stocks
	Production	Imports	Total	Consump- tion	Exports	Month- End- Stocks	Production	Imports	Total	Consump- tion	Exports		
Natural rubber, total	0	63,941	63,941	39,483	1,400	84,288	0	752,700	752,700	666,130	8,644	84,288	
Latex, total	0	3,954	3,954	5,516	0	4,927	0	51,443	51,443	56,138	0	4,927	
Rubber and latex, total	0	67,895	67,895	44,999	1,400	89,215	0	804,143	804,143	720,268	8,644	89,215	
Synthetic rubbers, total	445,305	1,603	53,802	53,364	747	52,758	440,633	25,722	501,906	538,289	7,652	52,758	
GR-S types	439,313	1,231	41,973	42,116	55	36,942	430,801	20,639	378,887	416,230	900	36,942	
Butyl	45,992	372	6,364	6,084	0	7,243	47,447	5,083	60,915	466,348	31	7,243	
Neoprene	44,377	0	4,377	3,980	531	5,733	45,067	0	50,667	43,781	4,826	5,733	
Nitrile types	1,088	0	1,088	1,184	161	2,840	1,103,037	0	12,037	11,930	1,895	2,840	
Natural rubber and latex, and synthetic rubbers, total	52,199	69,498	121,697	98,363	2,147	141,973	476,184	829,865	1,306,049	1,258,557	16,296	141,973	
Reclaimed rubber, total	32,480	152	32,632	29,905	1,241	33,708	313,006	1,002	314,008	1,303,733	11,740	33,708	
GRAND TOTALS	84,679	69,650	154,329	128,268	3,388	177,681	789,190	830,867	1,620,057	1,562,290	28,036	177,681	

a Includes adjustment of -1,366 tons applicable to August and October.

b Includes year-end adjustment of +3,581 tons.

c Includes year-end adjustment of +1,899 tons.

d Government plant production.

e Private plant production.

f Includes adjustment of +751 tons applicable to January-October.

g Includes year-end adjustment of +2,627 tons.

h Includes year-end adjustment of +80 tons.

i Includes year-end adjustment of +1,013 tons.

j Includes adjustment of -2,960 tons applicable to January-October.

k Includes year-end adjustment of +1,227 tons.

l Includes year-end adjustment of +278 tons.

SOURCE: Industry Operations Bureau, NPA, United States Department of Commerce, Washington, D. C.

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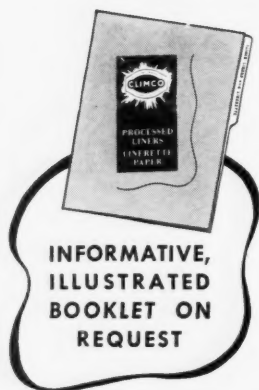
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